

LIFE SCIENCES EQUIPMENT FINDINGS
FROM ARTIFACTS OF
JOINT POW/MIA ACCOUNTING COMMAND
CASE 0608

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009□
Initialed By: S. F. R.

LIFE SCIENCES ARTIFACT SECTION



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EVALUATION OF ARTIFACTS

ORIGINATING FROM SOUTH EAST ASIA GROUND LOSS SITES

SUBJECT: EVALUATION OF LIFE SCIENCES EQUIPMENT ARTIFACTS
FROM: HSW/YACE
LIFE SCIENCES ARTIFACT SECTION
514 SHOP LANE (BLDG. 323)
KELLY AFB TX 78241-6434
TO: JOINT TASK FORCE- FULL ACCOUNTING
P. O. BOX 64044
CAMP H. M. SMITH
HAWAII 96861-4044

| | | |
|---------------------------|---------------------------------|----------------------------------|
| ARTIFACT LOT: 1 | BATCH: A | DATE RECEIVED BY LSAS: 02 FEB 99 |
| ARTIFACT TOTAL IN LOT: 05 | BATCH TOTAL: 1 | |
| JTF-FA CASE NUMBER: 0608 | BATCH IDENTIFICATION: I-V | |
| SITE LOCATION: LAOS | ANALYSIS COMMENCED: 04 MARCH 99 | |

INTRODUCTION:

This report contains findings of the laboratory studies accomplished upon artifacts identified by the Joint Task Force-Full Accounting, as having originated from a ground loss site in Laos. Following field recovery, the artifacts were returned to the United States and initially segregated into different system groups by Field Analyst personnel, including some trained by the Life Sciences Equipment Laboratory who specialize in life sciences equipment. (This equipment category encompasses most systems associated with: all types of aircrew flight ensembles, military uniforms, combat infantry equipment, aircraft fixed or ejection seats, along with other devices used for escape, survival and evasion; most special application and personnel parachute equipment, ejection seat drogue parachutes, and aircraft braking parachutes; all forms of land surface terrain and water environment survival aids, including man/aircraft mounted survival kits, life rafts and personnel life preservers; avionic locators and communication devices; and numerous other items ranging from combat body armor to personnel identification tags or blood chits.)

Initial review of the laboratory submitted artifacts disclosed evidence of a fairly uniform level of damage patterning, including some degree of fragmentation and heavy soil contamination (indicating long-term environmental exposure). In an overall initial assessment of the recovered

artifacts, all appeared to be consistent with an origin that is not representative of United States Military (or Allied Forces) equipment types used during the South East Asia conflict period.

The artifacts were subsequently studied in greater detail, including required evidence documentation and photography. Those artifacts that might display the most evidence potential were also subjected to very detailed scientific review and testing, based upon an order of prioritization. The highest priority and greatest level of testing being accorded to those artifacts that would provide direct information pertaining to the status of any personnel involved in the ground loss under review. Other levels are assigned to artifacts that assist in substantiating the identity of any other life sciences equipment items, the type of systems into which they would be installed or, if possible, even the serviceability levels of such systems at the time of the loss. All of the artifacts were then subjected to very detailed scientific review and testing. The methods by which the scientific examinations are conducted also involve many mediums of inspection and testing as typified by: optical microscopy, CRT tomography, energy dispersive x-ray analysis, or scanning electron microscopy, which includes detailed comparison to equipment exhibits that have been authenticated to the original component or series from which the artifacts are believed to have originated (a large collection of which are retained by the Laboratory for reference purposes). The equipment exhibits used for reference purposes are often not new, with many items being retained from previous mishaps, or acquired from military equipment surplus sources for use in current and future investigations. As a result, microscopy may reveal anomalies consistent with prolonged use or aging. However, these anomalies do not affect the overall design characteristics of such equipment exhibits, or their value regarding determinations reached about a case. In addition to physical comparison, artifacts are compared to technical data, manufacturing information, military design specifications, and various other forms of historical documentation. Finally, where areas of doubt may still exist about evaluation results, which cannot adequately be resolved by testing or basic research action, other agencies or equipment experts are consulted to potentially locate more information, define or substantiate existing information, or acquire alternative avenues for other scientific research. This practice is applied broadly to artifact studies and frequently extends throughout the whole national military-industrial complex and into

international research endeavors. In JTF-FA Case 0608 many of the above procedures were employed, and a listing of other specialists and agencies contacted is attached as Appendix C; while Appendix A is of the artifact receipt condition; and Appendix B is other laboratory analyses inputs. It will/may be noted in the Supplemental Laboratory Analysis Report enclosed that terms like "similar" are used. These terms should not be construed as meaning marginal or incorrect identification, but instead deals with the basic environmentally exposed origins of artifacts versus scientific control samples used in their evaluation. This problem of condition difference is also not specific to South East Asia originating artifacts, but instead pertains to all aircraft mishaps and military action sites. Consequently, while the function of such analysis is to provide unbiased scientific data, it may also include factors which instrumentation cannot be programmed to compensate for, such as: the individual conditions prevailing in mishaps or ground actions, subsequent initial evidence tampering by indigenous personnel, or the effects of final artifact recovery operations at a site. Accordingly, sections of artifact items like combat pack webbing might display such characteristics as: dynamically applied tensions, abrading against other equipment in an explosion, thermal exposure, environmental deterioration, or the effects of tampering, such as from being dug up with hand tools. These factors are therefore, taken into account in the final analysis, and in fact some deterioration levels, when carefully studied and patterned between artifacts, actually add to artifact authenticity by providing a particular site signature. This thereby reduces such potentials as their having originated from sources unrelated to that mishap site, when examined by competent scientific specialists using sophisticated instrumentation and equipment.

This report also contains the evaluation results for all primary artifacts/groups studied, as dictated by the prioritization methods previously described. Also listed will be the degree of identification accuracy assigned to each artifact/group, which is normally derived from the levels of substantiation attained by direct material compositional matching to a known control sample or correlation to researched data, to provide the determination categories of Identification: Confirmed, Probable, Unconfirmed or Unknown.

Finally, at the end of this report an Overall Summation of artifact findings is included, along with a Conclusion Section based upon all of the collated scientific evidence gathered.

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IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

1. PLASTIC SHEET MATERIAL

IDENTIFICATION: UNCONFIRMED ORIGIN

A total of five artifact fragments submitted for analysis were correlated to Plastic Sheet Material (as per Textile Laboratory testing (see Appendix B)). The artifacts were forwarded for possible identification, and are believed to have a possible origin association with a wet weather poncho. Each of the artifacts comprised a thin, plastic material, and all were received in a fragmented and crumpled/folded state (seen in Pictures 1-5).



JTF-FA
CASE: 0608

PICTURE 1. A PLASTIC SHEET MATERIAL ARTIFACT (1 of 5).



JTF-FA
CASE: 0608

PICTURE 2. A PLASTIC SHEET MATERIAL ARTIFACT (2 of 5).



JTF-FA
CASE: 0608

PICTURE 3. A PLASTIC SHEET MATERIAL ARTIFACT (3 of 5).



JTF-FA
CASE: 0608

PICTURE 4. A PLASTIC SHEET MATERIAL ARTIFACT (4 of 5).



JTF-FA
CASE: 0608

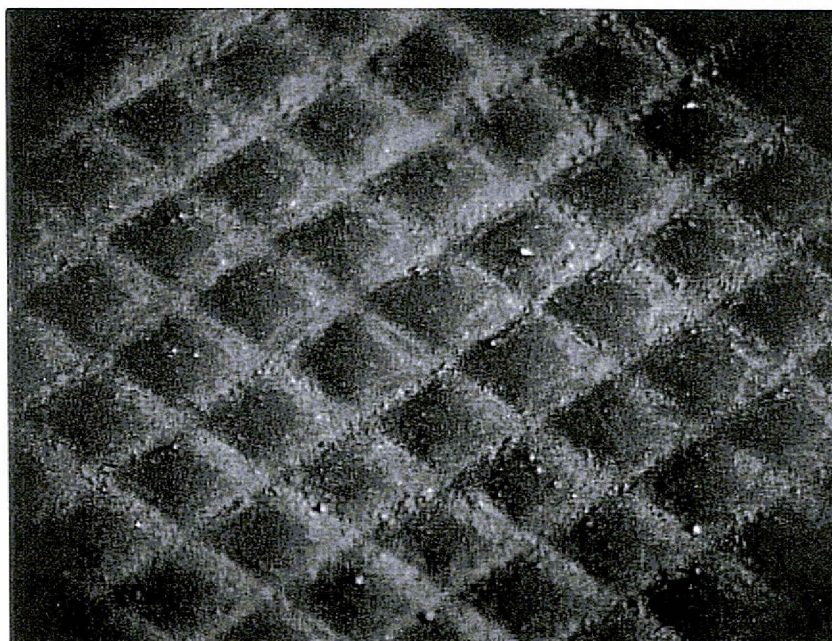
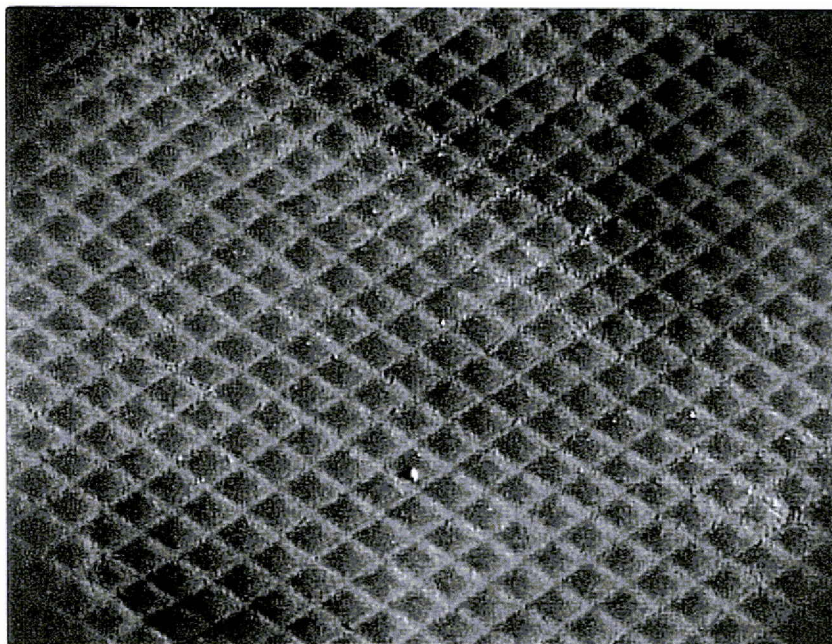
PICTURE 5. A PLASTIC SHEET MATERIAL ARTIFACT (5 of 5).

While the artifacts displayed overall similar construction characteristics, four artifacts matched one another exactly in material thickness and texture patterns, while the fifth differed in these areas. The four similar artifacts were made of a very thin, pliable, plastic-like material. Upon close visual and stereo microscopic study (20x), these four artifacts were noted to display a textured surface on both sides of the material (Picture 6 below).

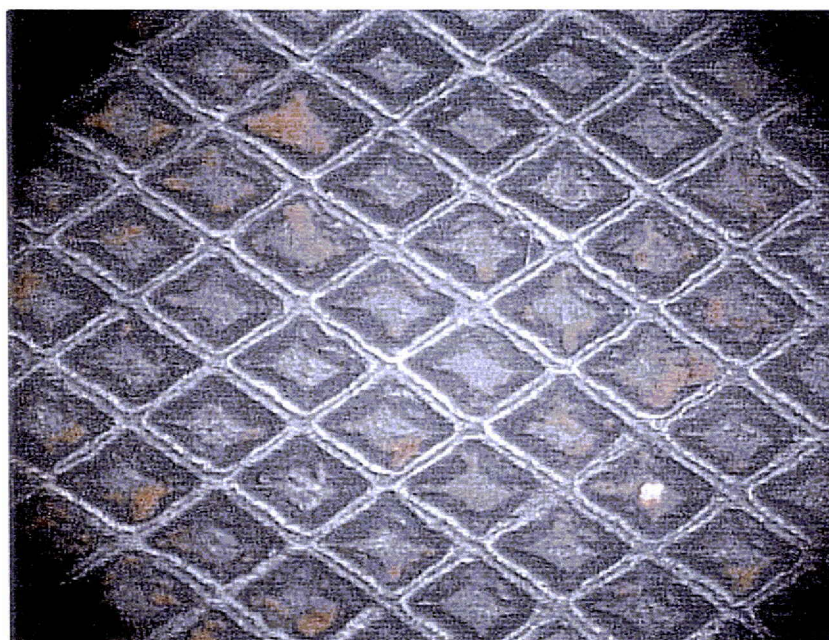
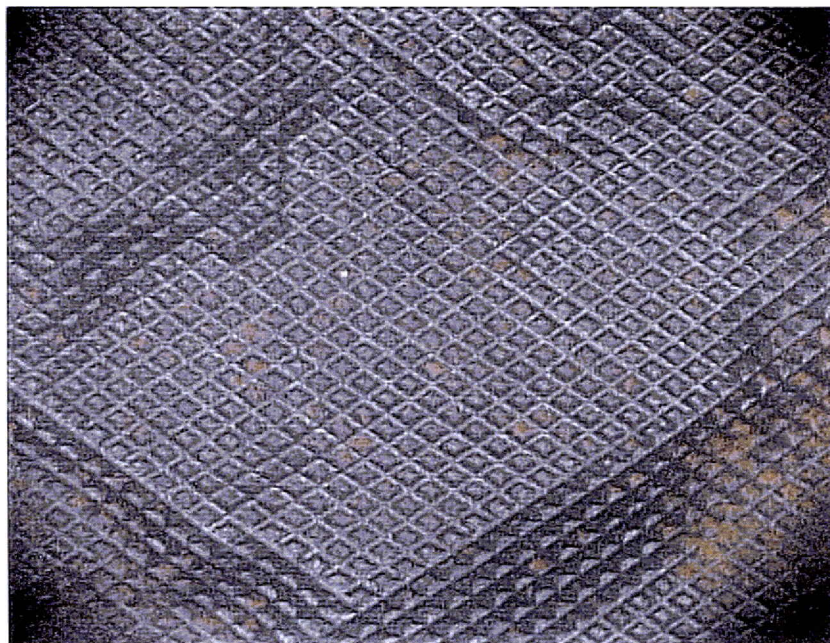


PICTURE 6. A CLOSE-UP VIEW OF ONE SIDE OF THE SIMILAR
ARTIFACT'S TEXTURED SURFACE.

The observed textured surface pattern was a minute crosshatch design, and was apparently the result of a molded fabrication process. This molding process created a slightly raised, bumped surface on one side of the material, and a dimpled surface on the other (Pictures 7-10).



PICTURES 7 & 8. A CLOSE DETAIL (TOP) AND HIGH DETAIL (BOTTOM) VIEW OF THE CROSSHATCH DESIGN (BUMPED SIDE) SEEN ON EACH OF THE SIMILAR ARTIFACTS, THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT 3.2x AND 12.8x MAGNIFICATION RATES, RESPECTIVELY.).
(Note: The distinctive and uniform symmetry of the crosshatch design.)



PICTURES 9 & 10. A CLOSE DETAIL (TOP) AND HIGH DETAIL (BOTTOM) VIEW OF THE CROSSHATCH DESIGN (DIMPLED SIDE) SEEN ON EACH OF THE FOUR SIMILAR ARTIFACTS, THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT 3.2x AND 12.8x MAGNIFICATION RATES, RESPECTIVELY.).
(Note: The unique depressions of the dimpled surface.)

As the same textured surface pattern was molded on each of the four similar artifacts, this supports that they all originated from the same source, possibly a garment. This observation is supported by the fact that three of the four artifacts displayed stitched seams (Picture 11), suggesting that they may have been attached to one another, or another item, at one time. However, because these seam features on the artifacts are generic in nature, they could not be accurately associated to each other. Furthermore, no evidence was found that could assist in the alignment of any artifact to a particular origin or source (such as remnants of stitch thread, or an attached/sewn section of material).



PICTURE 11. A CLOSE-UP VIEW OF THE STITCHED SEAM ON ONE OF THE
FOUR SIMILAR ARTIFACTS.

As the five artifacts were submitted as potential rain poncho artifacts, they were physically compared to various types of military issue wet weather ponchos/raingear that could have been used during this loss incident period. In an attempt to possibly identify their origin, the artifacts were compared to three specific military issue wet weather garment types: a South East Asia-era U.S. Military issue Poncho, Wet Weather (Early Model) (Pictures 12 & 13); a South East Asia-era U.S. Military issue Poncho, Wet Weather (Late Model); and an Australian Military Raincoat.



PICTURE 12. THE U.S. MILITARY ISSUE PONCHO, WET WEATHER (EARLY MODEL) (FRONT VIEW).

Because two major variants of the U.S. Military wet weather poncho were developed and utilized during the 1960's, they will, within this report henceforth, be individually referred to as the 'Early Model' and 'Late Model' Ponchos.



PICTURE 13. THE U.S. MILITARY ISSUE PONCHO, WET WEATHER (EARLY MODEL) (REAR VIEW).

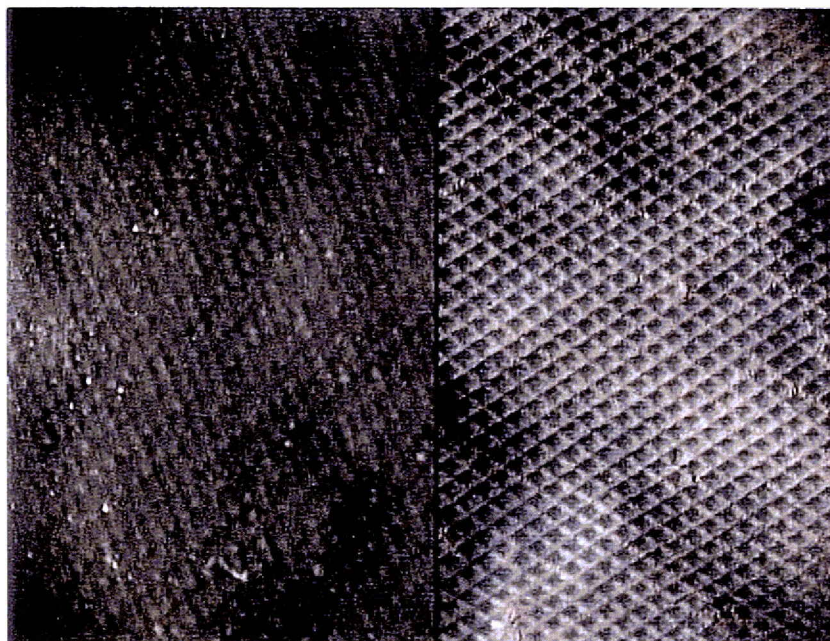
Initially, a series of microscopy studies were undertaken to compare the surface features of the artifact material to those of each reference garment type. Using a Leica DMC Comparison Macroscope, an artifact sample was first compared to the material of the U.S. Wet Weather Poncho, (originally labeled 'Poncho, Lightweight, With Hood'). This Early Model Poncho (EMP) was first introduced into service in 1961, and initially was the standard issue poncho for U.S. military ground forces in the South East Asia (SEA) theater of operations (Picture 14 below). In design, the EMP was basically a large tarp fitted with a hood, and overall measured 6.5 x 5.5 feet. Manufactured in one size to fit all, it was worn by simply placing it over the head and torso. Its design features included sides and ends that were hemmed, and equipped with snap fasteners (to secure the open sides), as well as grommets (for attaching cords to convert it to a tent/shelter). Also included were a hood with drawcord for face opening adjustment, and a separate drawcord for waist adjustment (refer to Illustration 4 on page 21).



PICTURE 14. AN OFFICIAL U.S. ARMY PHOTO TAKEN IN VIETNAM, SHOWING A U.S. SOLDIER WEARING THE PONCHO, WET WEATHER (EMP), CIRCA 1966.

The EMP featured a unique material type, which consisted of a heat set, 1.6 ounce twill nylon cloth, coated on both sides with a compound of polymerized or copolymerized virgin vinyl chloride resin, and plasticized with a phosphate or phthalate ester plasticizers (as per Military Specification 'MIL-C-40039B', Cloth, Coated, Nylon, Vinyl Coated, dated 31 May 1963) (refer to Illustrations 1-8).

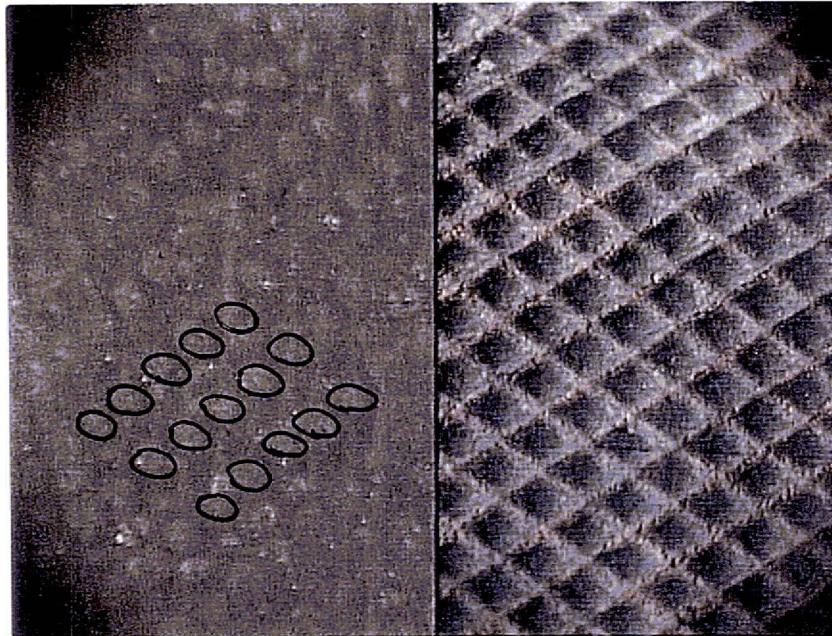
Upon macroscopic dual image comparisons, it was clearly apparent that no similarities existed between the EMP and artifact samples. Unlike the uncoated material of the artifact, the EMP sample was completely coated. However, in spite of the vinyl resin overcoat, the weave pattern of the EMP nylon cloth was discernable (seen in Pictures 15 & 16).



PICTURE 15. A SPLIT-LENS PHOTO OF THE EMP SAMPLE (LEFT SIDE), ALONGSIDE A SAMPLE OF THE ARTIFACT MATERIAL, AS SEEN THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT A 2.5x MAGNIFICATION RATE).
(Note: The dissimilarity of the coated EMP sample, in contrast to the totally exposed surface of the artifact.)

In addition, the EMP fabric weave pattern did not correspond to the unique crosshatch pattern of the artifact. This difference is again consistent with the artifact's crosshatch pattern being molded (as with a plastic material) rather than woven (like a cloth, as found with the nylon cloth which served as the base material for the EMP (Picture 16 below)).

(For reference purposes and to better present technical information applicable to the EMP, pertinent pages from associated Military Specifications have been reproduced and included on the following pages (Illustrations 1-8).)



PICTURE 16. A SPLIT-LENS PHOTO OF THE EMP SAMPLE (LEFT SIDE), ALONGSIDE A SAMPLE OF THE ARTIFACT MATERIAL, AS SEEN THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT A 6.4x MAGNIFICATION RATE).
(Note: The faint weave pattern of the EMP nylon cloth (outlined), unlike the molded pattern of the artifact's material.)

MIL-P-3003G

31 MAY 1963

SUPERSEDING

MIL-P-003003F (GL)

10 APRIL 1963

MIL-P-3003E

27 JUNE 1961

MILITARY SPECIFICATION

PONCHO, LIGHTWEIGHT WITH HOOD

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers a lightweight poncho, with hood, of one type and size, for use as a rain garment and other purposes (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

- V-T-276 — Thread, Cotton.
- UU-T-111 — Tape; Paper, Gummed (Sealing and Securing).
- CCC-T-191 — Textile Test Methods.
- PPP-B-636 — Box, Fiberboard.

MILITARY

- MIL-B-871 — Braid, Textile (Tubular).
- JAN-K-1051 — Keeper, Slide, Plastic, Ball Type.

- MIL-T-3530 — Treatments, Mildew Resistant and Water Repellent for Thread and Twine.

- MIL-F-10884 — Fasteners, Snap.

- MIL-G-16491 — Grommet, Metallic.

- MIL-B-17757 — Boxes, Fiber Corrugated.

- MIL-C-40089 — Cloth, Coated, Nylon, Vinyl Coated.

STANDARDS

FEDERAL

- Fed. Std. No. 751 — Stitches, Seams, and Stitching.

MILITARY

- MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes.

- MIL-STD-129 — Marking for Shipment and Storage.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

FSC 8405

ILLUSTRATION 1. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE BASIC SCOPE AND OVERALL SPECIFICATIONS FOR MANUFACTURING THE PONCHO (EMP). (NOTICE THE ORIGINAL PONCHO NOMENCLATURE.) (SOURCE: MILITARY SPECIFICATION 'MIL-P-3003G', DATED 31 MAY 1963.)

MIL-P-3003G

3. REQUIREMENTS

3.1 Laboratory report approval (preaward). Unless otherwise specified at the time of submission of a bid (see 6.2), the bidder shall submit to the contracting officer a certified copy of a recent laboratory report containing test data which demonstrate that the sealant, method of applying, and the finished sealed seam area of the poncho, has been tested and found to comply with the requirements of this specification. Any of the following types of reports will be satisfactory from the standpoint of this requirement:

- (a) An independent or commercial laboratory report.
- (b) The prospective contractor's own laboratory report.
- (c) A governmental laboratory report from a contract within not more than one year of date of submission of bid.

The purpose of the above requirement is to assist the Government to determine the capability of bidders to supply ponchos meeting all requirements of this specification. The submission of an acceptable report under this requirement shall not be construed as relieving a supplier from subsequently meeting all requirements of this specification on all deliveries.

3.2 Preproduction sample approval. When specified before production is commenced, the supplier shall submit a finished poncho to the contracting officer for approval with a certified copy of a laboratory report containing test data showing that the finished poncho has been tested and found to comply with the requirements specified herein (see 6.2).

3.3 Sample. Samples are furnished solely for the guidance and information to the supplier. Variations from the specification may appear in the sample, in which case the specification shall govern (see 6.3).

3.4 Materials.

3.4.1 Basic cloth. The cloth utilized in fabrication of the poncho shall be cloth, coated,

nylon, vinyl coated, conforming to Specification MIL-C-40039.

3.4.2 Thread. The thread for seaming the poncho shall be thread, cotton, machine, soft finish, type IA3, ticket numbers 30 and 50, 3 ply and 70, 2 ply, conforming to Specification V-T-276.

3.4.2.1 Color and colorfastness. The thread shall be dyed shade S-1, cable No. 66022, and no color fastness requirements shall apply.

3.4.2.2 Treatment. The thread shall be given a water repellent treatment in conformance with the requirements of Type II treatment of Specification MIL-T-3530.

3.4.2.3 Thread lubrication. Water and isopropyl alcohol only may be used for lubrication for sewing purposes of the thread or the coated fabric. A certificate of compliance to the contracting officer stating that materials other than those specified above have not been used shall be submitted.

3.4.3 Grommets. The grommets shall be brass, black chemical finish with toothed washers 0 and 3 conforming to type II, class 3 of Specification MIL-G-16491.

3.4.4 Snap fasteners. The snap fasteners shall consist of a socket and stud-eyelet combination conforming to Specification MIL-F-10884 as follows:

- (a) The socket shall be construction A, B, C or D, style 2, finish 2.
- (b) The stud-eyelet combination shall be size 1 or 2, style 2, finish 2.

3.4.5 Drawcords. The drawcords shall be braid cotton tubular, dyed Olive Green 107, water repellent finished conforming to type IV of Specification MIL-B-371, except that the requirements for colorfastness to laundering and bleaching shall not apply. In addition, the braid shall be mildew resistant treated conforming to type 1, class 1 of Specification MIL-T-3530. The ends of the drawcord shall be either tipped or resin coated.

ILLUSTRATION 2. A MILITARY SPECIFICATION EXCERPT, SHOWING THE MATERIALS REQUIRED FOR MANUFACTURING THE PONCHO (EMP) (PARAGRAPH 3.4: HIGHLIGHTED). (NOTE THE 'BASIC CLOTH' PARAGRAPH (3.4.1) FURTHER MENTIONS 'MIL-C-40039' (BOTH HIGHLIGHTED).) (SOURCE: MILITARY SPECIFICATION 'MIL-P-3003G', DATED 31 MAY 1963.)

MIL-P-3003G

3.4.6 Slide keeper. The slide keeper shall be either a plastic ball type, conforming to Specification JAN-K-1051, or a plastic rectangular type as specified herein. The color shall be olive drab shade No. 7. The rectangular keeper shall measure $1\frac{1}{4}$ by $\frac{3}{4}$ by $\frac{1}{8}$ inches. Two $\frac{1}{4}$ inch round holes shall be located on the center line parallel to the $\frac{3}{4}$ inch dimension, one hole being centered $\frac{5}{16}$ inch from each end of the keeper. The rectangular keeper shall be of such flexibility as to make it suitable for the purpose intended.

3.4.7 Reinforcement materials.

3.4.7.1 Snap fasteners and grommet reinforcements. The cloth for reinforcing the grommets and snap fasteners shall be lightly coated cotton cloth weighing a minimum of 7.5 ounces per square yard and having a minimum breaking strength of 75 pounds in both warp and filling. The light coating on both sides shall be accomplished with a polymerized or copolymerized vinyl chloride resin plasticized exclusively with either phosphate of phthalate esters. The contractor shall submit a certificate of compliance to the contracting officer stating that he has conformed with the above requirements.

3.4.7.2 Neck seam reinforcement. The cloth used to reinforce the neck seam shall be the basic material specified in 3.4.1.

3.4.8 Seam sealant. The seam sealant used to seal the seams and allowable needle holes shall be a pigmented solvent solution of polymerized or copolymerized virgin vinyl chloride resin utilizing either a phosphate or phthalate ester type plasticizer only. Only acrylonitrile rubber or acrylate additives may be used to increase the working properties of the sealant.

3.4.8.1 Color. The seam sealant after drying, shall produce a color approximately matching the shade of the basic cloth specified in 3.4.1.

3.4.8.2 Certification. A certificate of compliance to the contracting officer stating con-

formance with all requirements for the seam sealant shall be submitted.

3.4.9 Seam dusting material. All sealant areas shall be dusted with powdered mica not coarser than 160 mesh when tested as specified in 4.3.1.1 to prevent blocking.

3.5 Design. The design of the poncho shall conform to fig. 1 of this specification. The poncho shall have sides and ends that are hemmed and shall be equipped with snap fasteners for closing as well as grommets for attaching tent pin lines. It shall have a hood with drawcord for face opening adjustment; and a drawcord for waist adjustment.

3.6 Patterns. Standard patterns shall be furnished by the contracting officer and shall be used only as a guide for cutting working patterns. Standard patterns provide a $\frac{1}{2}$ inch allowance for all seams except the top, bottom and sides of the waist drawcord tunnel, side edges of hood facing pieces and bottom edge of earphone pieces where $\frac{1}{4}$ inch seam allowance is provided, and where $\frac{3}{8}$ inch seam allowance is provided for separate side and end facings. The patterns show the size and placement of neck opening as well as markings for the proper assembly of all parts. Standard patterns shall not be altered in any manner and working patterns shall not be modified without prior approval of the contracting officer except as outlined in 3.10. The working patterns shall be identical to the standard patterns.

3.6.1 List of pattern parts. The component parts of the Poncho, Lightweight, with hood, shall be cut from materials as specified in accordance with the pattern parts indicated.

List of Pattern Parts

| Materials | Nomenclature | Qty Parts |
|-------------------------------------|---------------------------|-----------|
| Cloth, coated, nylon, vinyl coated. | Neck reinforcement piece. | 1 |
| | Hood | 1 |
| | Hood facing piece | 2 |
| | Drawcord (waist) tunnel. | 1 |
| | Earphone cover | 2 |
| | Side piece | 2 |
| | Body of poncho | 1 |

MIL-C-40039B

31 MAY 1963

SUPERSEDING
MIL-C-40039A
3 MAY 1962

MILITARY SPECIFICATION

CLOTH, COATED, NYLON, VINYL COATED

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers the requirements of one type of cloth, nylon, vinyl coated to be used in the fabrication of the poncho, lightweight, with hood.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

CCC-T-191 — Textile Test Methods.

PPP-B-636 — Box, Fiberboard.

PPP-P-51 — Packaging, Packing, and Marking of Textile Fabrics (Woolens, Worsted, Cottons, Silks and Synthetics).

MILITARY

MIL-C-577 — Cloth, Nylon, Twill, 1.6 and 3.0 Ounce.

STANDARDS

FEDERAL

Fed. Test Method Std. No. 406 —
Plastics, Methods of Testing.

Fed. Test Method Std. No. 601 —
Rubber, Sampling and Testing.

MILITARY

MIL-STD-105 — Sampling Procedures
and Tables for Inspection by Attributes.

(Copies of specifications, standards, and drawings required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Laboratory report approval. Unless otherwise specified (see 6.2), prior to award, the bidder shall submit to the contracting officer a certified copy of a recent laboratory report covering the coated fabric which he proposes to deliver. Unless otherwise specified by the contracting officer, the bidder shall certify that the coated fabric was manufactured in a plant where the coating will be performed if a contract is awarded. This

Reply No. 8 of DP
WATERPROOF

FSC 8305

ILLUSTRATION 5. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE BASIC SCOPE AND OVERALL SPECIFICATIONS OF THE VINYL COATED NYLON CLOTH, USED IN THE PONCHO'S (EMP) MANUFACTURE.
(SOURCE: MILITARY SPECIFICATION 'MIL-C-40039B', DATED 31 MAY 1963.)

MIL-C-40039B

laboratory report shall contain test data which demonstrates that the finished product which the supplier proposes to deliver has been tested and found to comply with the requirements of this specification. Any of the following types of reports will be satisfactory from the standpoint of this requirement:

- (a) An independent or commercial laboratory report.
- (b) The prospective supplier's own laboratory report.
- (c) A governmental laboratory report from a contract within not more than six months of date of submission of bid.

The purpose of the above requirement is to assist the Government to determine the capability of bidders to manufacture a cloth meeting all requirements of the specification on all deliveries.

3.2 Samples.

3.2.1 Standard sample. The cloth shall match the standard sample for shade and luster and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2.2 Preproduction sample. When specified (see 6.2), before production is commenced, a 3½ yard sample of the coated fabric and a three yard sample of the base fabric shall be submitted to the contracting officer or his authorized representative for inspection as specified in 4.2.2. The approval

of the preproduction sample authorizes the commencement of production but does not relieve the supplier of the responsibility for compliance with all provisions of this specification. The preproduction sample shall be manufactured by the supplier in the same facilities to be used for the manufacture of the production items.

3.3 Materials.

3.3.1 Base fabric. The base fabric shall be cloth, nylon, twill, 1.6 ounce, heat set, conforming to type I of Specification **MIL-C-577**.

3.3.2 Coating compound. The coating compound shall be polymerized or copolymerized virgin vinyl chloride resin, plasticized with phosphate or phthalate ester plasticizers exclusively, and pigmented to meet the requirements herein. A certificate of compliance shall be furnished by the supplier to the contracting officer stating the type of resin and plasticizer utilized.

3.4 Coated fabric. The base fabric shall be coated on both sides with the coating compound specified in 3.3.2. Distribution of coating shall be such that one side of the fabric is more lightly coated than the other (see 6.5). The lighter coating shall be on the face side of the fabric. The face side of the fabric as referenced herein shall be the side with the twill line running from lower left to upper right. At least one coat of coating-compound shall be applied directly to each side of the fabric. The coated fabric shall conform to the requirements of table I when tested as specified in 4.4.

ILLUSTRATION 6. A MILITARY SPECIFICATION EXCERPT, SHOWING THE MATERIALS REQUIRED FOR THE VINYL COATED NYLON CLOTH (PARAGRAPH 3.3 SERIES: HIGHLIGHTED). (ALSO NOTE PARAGRAPH 3.3.1 FURTHER MENTIONS A 1.6 OUNCE TYPE CLOTH AND 'MIL-C-577'. PARAGRAPH 3.4 OUTLINES THE SPECIFICS OF THE COATING PROCESS (ALL HIGHLIGHTED).)
(SOURCE: MILITARY SPECIFICATION 'MIL-P-3003G', DATED 31 MAY 1963.)

MIL-C-577F

7 JULY 1964

SUPERSEDING

MIL-C-577E

27 JUNE 1960

MILITARY SPECIFICATION

*CLOTH, TWILL, NYLON, 1.6 AND 3.0 OUNCE

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 **Scope.** This specification covers nylon cloths which are suitable for coating.

1.2 **Classification.** The cloth covered by this specification shall be of the following types (see 6.2):

Type I—1.6 ounce

Type II—3.0 ounce

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

CCC-T-191—Textile Test Methods.

PPP-P-51 —Packaging, Packing and Marking of Textile Fabrics (Woolens, Worsted, Cottons, Silks, and Synthetics).

STANDARDS

FEDERAL

FED STD No. 4—Glossary of Fabric Imperfections

MILITARY

MIL-STD-105 —Sampling Procedures and Tables for Inspection by Attributes

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

★ 2.2 **Other publications.** The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

Rules and Regulations under the Textile Fiber Products Identification Act

(Application for copies should be addressed to the Federal Trade Commission, Washington 25, D.C.)

AMERICAN SOCIETY FOR TESTING MATERIALS

Materials Book of Standards D377-54.

(Application for copies should be addressed to American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.)

3. REQUIREMENTS

3.1 **Standard sample.** When a standard sample is established, the cloth shall match the standard sample for shade and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2. Material.

★ 3.2.1 **Fiber.** The fiber shall be bright high tenacity filament nylon.

3.2.2 **Yarns.** The warp yarn for both types I and II and the filling yarn for type I shall

FSC 8305

ILLUSTRATION 7. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE BASIC SCOPE AND OVERALL SPECIFICATIONS OF THE EMP NYLON TWILL CLOTH. (NOTE THAT PARAGRAPH 1.2 SHOWS THE 1.6 OUNCE CLOTH (TYPE I), AND PARAGRAPH 3.2.1 SHOWS THE CLOTH FIBER TYPE (HIGHLIGHTED).) (SOURCE: MILITARY SPECIFICATION 'MIL-C-577F', DATED 7 JULY 1964.)

MIL-C-577F

be 70 ± 4 denier multifilament, with 7 ± 2 turns of twist per inch, and the filling yarn for type II shall be 100 ± 5 denier multifilament (see 4.2.1).

3.3 Color. The color shall be as specified (see 6.2).

3.3.1 Matching. The color shall match the standard sample under natural (north sky) daylight or artificial daylight having a color temperature of 7500° Kelvin and shall be a good approximation to the standard shade under incandescent lamplight at 2800° Kelvin.

3.3.2 Colorfastness. The dyed cloth shall show fastness to dry cleaning, laundering, perspiration, crocking and light equal to or better than the standard sample. When no standard sample has been established or designated as applicable to colorfastness, the dyed cloth shall show good fastness to dry cleaning, laundering, perspiration, and light and shall show a Munsell Value for crocking not lower than 8.5. Testing shall be as specified in 4.4.

3.4 Physical requirements. The physical requirements of the finished cloth shall be as specified in table I when tested as specified in 4.4.

★ **3.4.1 Weave.** The weave of the cloth shall be as follows:

Type I $\frac{2}{1}$ Right hand twill

Type II $\frac{2}{2}$ Right hand twill

★ **3.4.2 Width.** The width shall be as specified and shall be the minimum width includ-

ing selvages (see 6.2), with each selvage not exceeding $\frac{1}{4}$ inch.

★ **3.5 Finish.** The cloth shall be scoured and shall not be calendered. The total chloroform-soluble and water-soluble material content of the finished cloth shall not exceed 1.0 percent when tested as specified in 4.4. The cloth shall have a pH of not less than 5.0 or more than 8.5 and shall not contain more than 0.003 percent copper or more than 0.0015 percent manganese when tested as specified in 4.4.

★ **3.6 Heat treating.** The cloth shall be heat treated. After treatment, the cloth shall show no appreciable distortion, puckering or fading; nor shall there be more than 2.0 percent dimensional change in either warp or filling when tested as specified in 4.4.

3.7 Length and put-up. Unless otherwise specified (see 6.2) the finished cloth shall be furnished in continuous lengths each not less than 50 yards. Each length shall be put up in a full width roll as specified in PPP-P-51.

3.8 Fiber identification. Each roll of cloth shall be labeled, ticketed or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act.

3.9 Workmanship. The finished cloth shall conform to the quality and grade of product established by this specification and the occurrence of defects shall not exceed the point level specified.

★ 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection require-

★ TABLE I. *Physical requirements*

| Type | Weight per sq. yd. | | Yarns per in. (minimum) | | Breaking strength (minimum) | | Tearing strength (minimum) | |
|------|--------------------|------|-------------------------|---------|-----------------------------|---------|----------------------------|---------|
| | Ounces | | Warp | Filling | Warp | Filling | Warp | Filling |
| | Min. | Max. | | | Pounds | Pounds | Pounds | Pounds |
| I | 1.6 | 1.8 | 80 | 80 | 90 | 90 | 4 | 4 |
| II | 3.0 | 3.3 | 165 | 196 | 180 | 170 | 6 | 6 |

2

ILLUSTRATION 8. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE OVERALL TECHNICAL SPECIFICATIONS OF THE EMP NYLON TWILL CLOTH (SOURCE: MILITARY SPECIFICATION 'MIL-C-577F', DATED 7 JULY 1964.)

The artifact sample was next compared to the material of the Late Model Poncho (LMP). Essentially identical in design to the EMP, the LMP differed only in that it was constructed with a Rip-stop nylon cloth, and had small modifications to the hood and waist drawstring design (Pictures 17 & 18). It was also made in two sizes (Type I: Standard, and Type II: Small), and two color patterns (Class I: Solid color (OD), and Class II: 4-color camouflage).



PICTURE 17. THE U.S. MILITARY ISSUE PONCHO, WET WEATHER (LATE MODEL, TYPE I: STANDARD SIZE, CLASS I: SOLID COLOR) (FRONT VIEW).

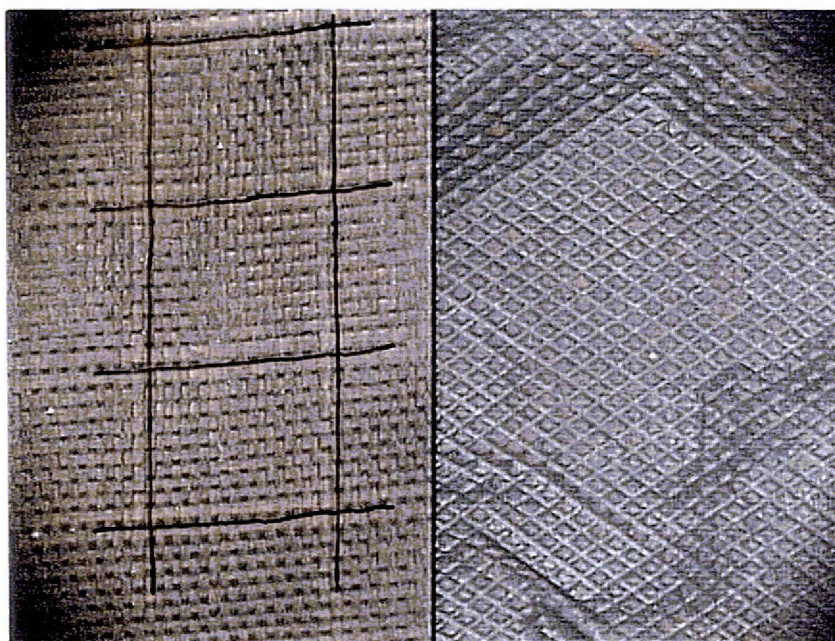
Classified as standard Army issue in April 1968, the LMP was the result of attempting to improve the EMP, primarily in featuring a reduced overall weight that was half of the EMP.



PICTURE 18. THE U.S. MILITARY ISSUE PONCHO, WET WEATHER (LATE MODEL, TYPE I: STANDARD SIZE, CLASS I: SOLID COLOR) (REAR VIEW).

Like the EMP, the LMP featured a distinctive material type, which consisted of a 1.6 ounce Rip-stop nylon cloth that was coated only on the exterior surface with a polyurethane compound (as per 'MIL-C-43473A', Cloth, Coated, Nylon, Polyurethane Coated, dated 19 September 1968 (refer to Illustrations 9-18)). Primarily used in the fabrication of parachutes, the Rip-stop nylon cloth was unique in that it utilized a special 'box' weave pattern that prevented/stopped an occurring rip in the cloth from enlarging (hence the cloth's name, 'Rip-stop').

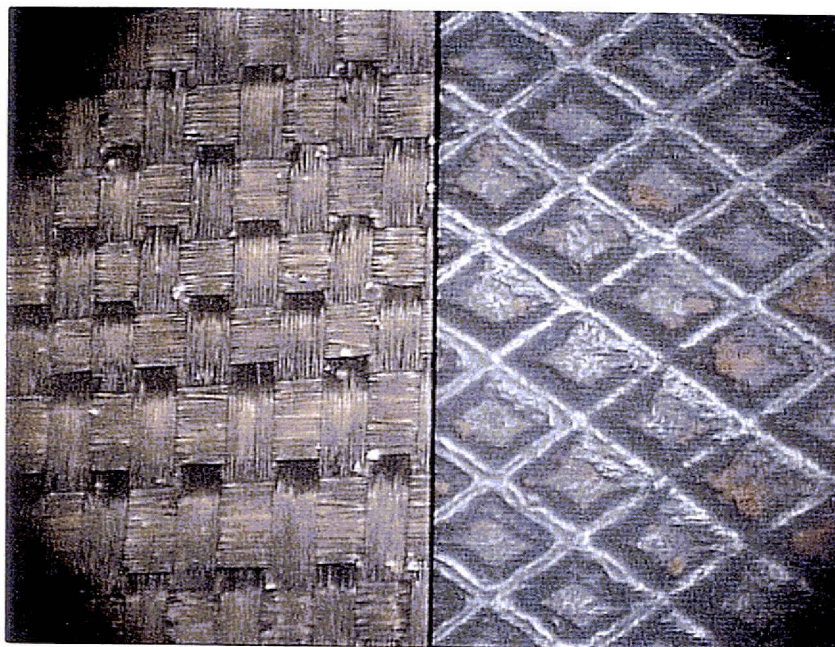
Following detailed macroscopic dual image comparison, it was clear that no similarities were apparent between the LMP and artifact samples. The LMP sample (Class I, solid OD color) clearly showed the distinctive 'box' weave pattern of the Rip-stop nylon cloth, which bore no resemblance to the molded crosshatch pattern of the artifact. (As only one side of the LMP nylon cloth is coated, microscopic study was conducted of the exposed cloth side, to better show it's detail (seen in Pictures 19 & 20).)



PICTURE 19. A SPLIT-LENS PHOTO OF THE LMP SAMPLE (LEFT SIDE) ALONGSIDE A SAMPLE OF THE ARTIFACT MATERIAL, AS SEEN THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT A 2.5x MAGNIFICATION RATE).
(Note: The distinctive 'box' weave pattern of the Rip-stop cloth LMP sample (outlined), in contrast to the artifact's molded pattern.)

As the fabric base of the LMP did not correlate in any fashion to the molded plastic artifact material, it again reflected that the artifact did not originate from a cloth-based wet weather garment, such as those typically utilized by U.S. ground forces in South East Asia.

(For reference purposes and to better present technical information applicable to the LMP, pertinent pages from associated Military Specifications have been reproduced and included on the following pages (Illustrations 9-19).)



PICTURE 20. A SPLIT-LENS PHOTO OF THE LMP SAMPLE (LEFT SIDE), ALONGSIDE A SAMPLE OF THE ARTIFACT MATERIAL, AS SEEN THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT A 6.4x MAGNIFICATION RATE).
(Note: The obvious fabric weave of the Rip-stop cloth LMP sample, unlike the molded surface of the artifact.)

MIL-P-43700

16 April 1970

SUPERSEDING
(see 6.6)

MILITARY SPECIFICATION

PONCHO, WET WEATHER; PONCHO, CAMOUFLAGE PATTERN

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope.- This specification covers two types and two classes of extra lightweight ponchos, with hoods, for use as rain garments and other purposes (see 6.1).

1.2 Classification.- The ponchos shall be of the following types, classes and optional construction methods as specified (see 6.2 and 6.3).

✓ Type I - Standard size (92 inches by 66 inches).

— Class 1 - Solid color.

Class 2 - 4-color camouflage pattern.

Type II - Small size (82 inches by 60 inches).

Class 2 - 4-color camouflage pattern.

Method 1 - Center seamed poncho.

Method 2 - One piece or side seamed poncho.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

FSC 8405 - 8415

ILLUSTRATION 9. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE BASIC SCOPE OF THE PONCHO (LMP). (NOTE THAT PARAGRAPH 1.2 SHOWS THE TYPE I AND AND CLASS I PONCHO CLASSIFICATIONS (HIGHLIGHTED).)
(SOURCE: MILITARY SPECIFICATION 'MIL-P-43700', PONCHO, WET WEATHER, DATED 16 APRIL 1970.)

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

MIL-P-43700

3.3 Sample.- Samples are furnished solely for the guidance and information to the supplier. Variations from the specification may appear in the sample, in which case the specification shall govern (see 6.3).

3.4 Materials.-

3.4.1 Coated cloth.- The coated cloth utilized in the fabrication of the class 1 poncho shall be 1.6 ounce rip-stop nylon, olive green 207, polyurethane coated one side, conforming to type I of MIL-C-43473. The coated cloth utilized in the fabrication of the class 2 poncho shall be 1.6 ounce rip-stop nylon, camouflage pattern, polyurethane coated one side, conforming to type II or III of MIL-C-43473.

3.4.2 Thread.- The thread for seaming the ponchos shall be conforming to polyester thread type I, class 1, sub-class A, sizes A and AA of V-T-285.

3.4.2.1 Color and colorfastness.- All thread shall be dyed Olive Drab shade S-1, C.A. 66022, and no colorfastness requirements shall apply.

3.4.2.2 Thread lubricant.- Water and isopropyl alcohol only may be used for lubrication for sewing purposes of the thread or the coated cloth (see 4.3.1.1).

3.4.3 Grommets.- The grommets shall conform to type II, class 3, sizes 0 and 3 of MIL-G-16491.

3.4.4 Snap fasteners.- The snap fasteners shall consist of a socket and stud eyelet combination conforming to MIL-F-10884 as follows:

- a. The socket shall be construction A, B, C or D, style 2 finish 2.
- b. The stud eyelet combination shall be size 1 or 2, style 2 finish 2.

3.4.5 Drawcords.- The drawcords shall be braid, textile, dyed Olive Green 107, conforming to type IV, class 3 of MIL-B-371, except that the requirement for colorfastness to laundering shall not apply. The ends of the drawcord shall be either tipped or resin coated.

3.4.6 Slide keeper.- The slide keeper shall be a rectangular plastic keeper and the color shall be Olive Drab Shade No. 7. The keeper shall measure 1-1/4 x 3/4 x 1/8 inches. Two 1/4 inch round holes shall be located on the center line parallel to the 1-1/4 inch dimension, one hole centered 5/16 from each end of the keeper. The keeper shall be of such flexibility as to make it suitable for the purpose intended (see 4.3.1.1).

ILLUSTRATION 10. A MILITARY SPECIFICATION EXCERPT, SHOWING THE MATERIALS REQUIRED FOR THE PONCHO (LMP) MANUFACTURE (PARAGRAPH 3.4: HIGHLIGHTED). (NOTE THAT PARAGRAPH 3.4.1 ('COATED CLOTH') FURTHER MENTIONS 'MIL-C-43473', ALSO HIGHLIGHTED.) (SOURCE: MILITARY SPECIFICATION 'MIL-P-43700', PONCHO, WET WEATHER, DATED 16 APRIL 1970.)

MIL-P-43700

3.4.7 Reinforcement materials.-

3.4.7.1 Snap fastener and grommet reinforcements.- The cloth for reinforcing the grommets and snap fasteners shall be lightly coated cotton cloth weighing a minimum of 7.5 ounces per square yard and having a minimum breaking strength of 75 pounds in both warp and filling. The light coating on both sides shall be accomplished with a polymerized or copolymerized vinyl chloride resin plasticized exclusively with either phosphate or phthalate esters (see 4.3.1.1).

3.4.8 Seam sealant.- The seam sealant used to seal the seams and allowable needle holes shall be either a dull translucent solvent solution of silicone sealant (see 6.5) or a dull unpigmented solvent solution of polyurethane. If plasticization of the sealant is necessary, only a phosphate or phthalate ester plasticizer may be used (see 4.3.1.1). The sealant shall meet the hydrolytic stability when tested as specified in 4.3.1.

3.4.8.1 Color and appearance.- The seam sealant used on the class 1 poncho, when dry, shall produce a color and appearance approximately matching the basic coated cloth specified in 3.4.1. The seam sealant used on the class 2 ponchos, when dry, shall not materially change the color and appearance of the camouflage print on the basic camouflage coated cloth specified in 3.4.1.

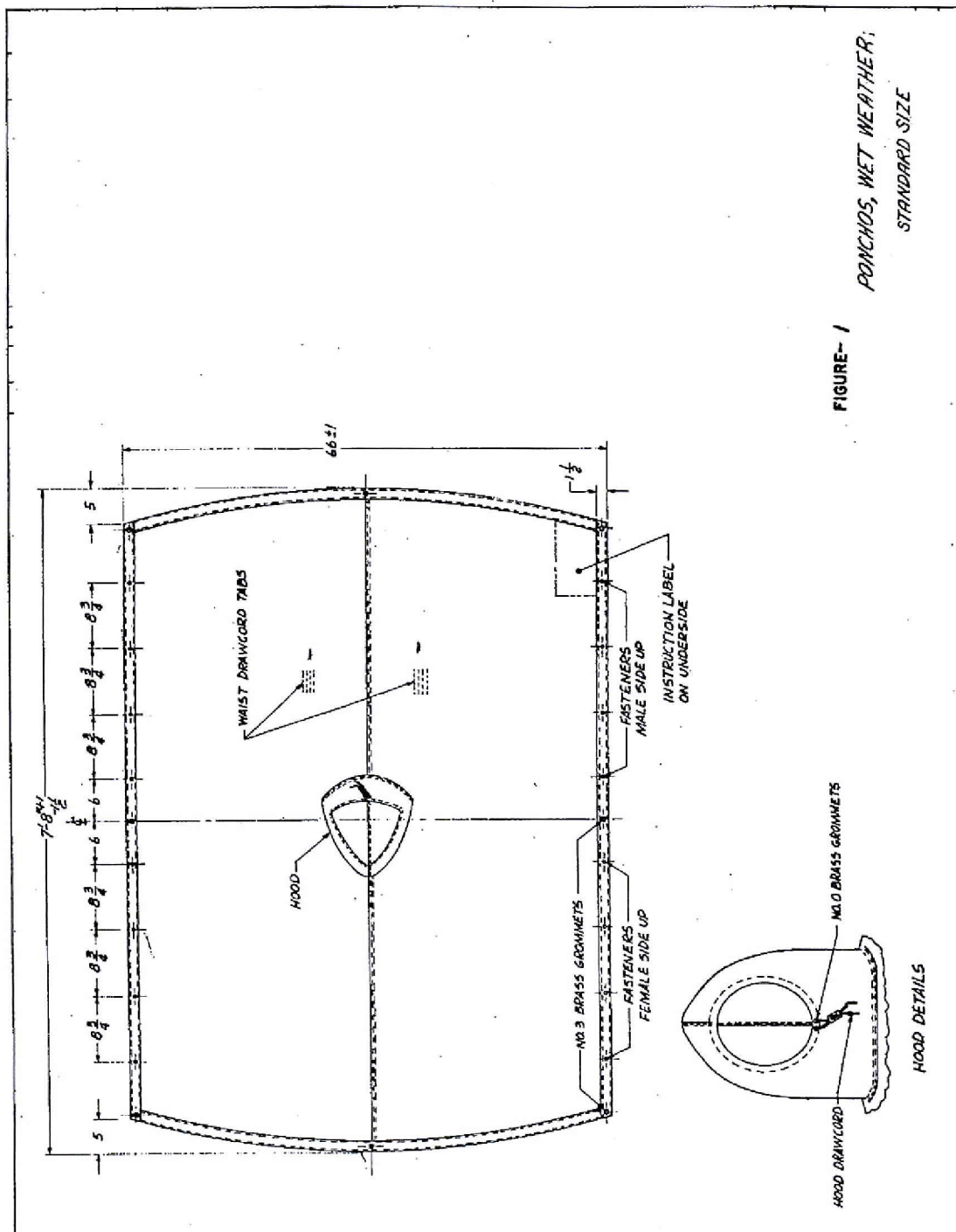
3.4.9 Seam dusting material.- All sealant areas shall be dusted with powdered mica, not coarser than 160 mesh (see 4.3.1.1).

3.5 Design.- The design of the poncho shall conform to figures 1 and 2 of this specification. The coated side of the cloth shall be on the outside of the poncho. The poncho shall have sides and ends that are hemmed and shall be equipped with snap fasteners for closing, as well as grommets for attaching tent pin lines. It shall have a hood with a drawcord for face opening adjustment, ~~and~~ a drawcord for waist adjustment. *for Type I, Class 2 poncho for waist adjustment*

3.6 Patterns.- Standard patterns shall be furnished by the contracting officer and shall be used only as a guide for cutting working patterns. Standard patterns provide a 1/2 inch allowance for all seams except waist drawcord tabs and side edges of hood facing pieces where 1/4 inch allowance is provided, and where 3/8 inch seam allowance is provided for separate side and end facings. The patterns show the size and placement of neck opening, as well as markings for the proper assembly of all parts. Standard patterns shall not be altered in any manner and working patterns shall not be modified without approval of the contracting officer except as outlined in 3.10. The working patterns shall be identical to the standard patterns.

ILLUSTRATION 11. A MILITARY SPECIFICATION EXCERPT, SHOWING THE DESIGN OUTLINE OF THE PONCHO (LMP) (PARAGRAPH 3.5: HIGHLIGHTED). (SOURCE: MILITARY SPECIFICATION 'MIL-P-43700', DATED 16 APRIL 1970.)

MIL-P-43700



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ILLUSTRATION 12. A MILITARY SPECIFICATION EXCERPT, SHOWING THE DESIGN DRAWING OF THE OVERALL PONCHO (LMP).
 (SOURCE: MILITARY SPECIFICATION 'MIL-P-43700', DATED 16 APRIL 1970.)

MIL-C-43473A

19 September 1968
SUPERSEDING
MIL-C-43473
28 December 1966

MILITARY SPECIFICATION

CLOTH, COATED, NYLON, POLYURETHANE COATED

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers the requirements for one type of polyurethane coated rip-stop nylon cloth.

2. APPLICABLE DOCUMENTS

- * 2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

- O-I-503 - Insect Repellent, Clothing and Personal Application.
- CCC-T-191 - Textile Test Methods.
- PPP-P-1136 - Packaging and Packing of Coated (Plastic, Rubber) and Laminated Fabrics.

MILITARY

- MIL-C-7020 - Cloth, Parachute, Nylon.

STANDARDS

FEDERAL

- Fed. Test Method - Plastics; Methods of Testing.
Std. No. 406
- Fed. Test Method - Rubber; Sampling and Testing.
Std. No. 601

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

FSC 8305

ILLUSTRATION 13. A MILITARY SPECIFICATION EXCERPT, SHOWING THE BASIC SCOPE AND OVERALL SPECIFICATIONS OF THE POLYURETHANE COATED NYLON CLOTH, USED IN THE PONCHO'S (LMP) MANUFACTURE. (SOURCE: MILITARY SPECIFICATION 'MIL-C-43473A', DATED 19 DECEMBER 1968.)

MIL-C-43473A

(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

3. REQUIREMENTS

3.1 Laboratory report approval.- Unless otherwise specified, at the time of submission of a bid, the prospective supplier shall submit to the contracting officer, a certified copy of a recent laboratory report covering the coated cloth which he proposes to deliver (see 6.2). Unless otherwise specified by the contracting officer, the bidder shall certify that the coated cloth was manufactured in a plant where the coating will be performed if the contract is awarded. The laboratory report shall contain test data which demonstrates that the finished cloth which the supplier proposes to deliver, has been tested and found to comply with all requirements of this specification. Any of the following types of reports will be satisfactory from the standpoint of this requirement.

- a. An independent or commercial laboratory report.
- b. The prospective bidder's own laboratory report.
- c. A Governmental laboratory report from a contract within 6 months of the date of submission of bid.

The purpose of the above requirement is to assist the Government to determine the capability of bidders to manufacture a coated cloth meeting all the requirements of the specification. The submission of an acceptable report under this requirement shall not be construed as relieving a supplier from subsequently meeting all requirements of the specification on deliveries.

3.2 Standard sample.- The coated cloth shall match the standard sample for shade and shall be equal to or better than the standard sample with respect to the characteristics for which the standard sample is referenced (see 6.3).

- * 3.3 First article.- When specified (see 6.2), before production is commenced, a three-yard sample of the coated cloth shall be submitted to the contracting officer or his authorized representative for inspection as specified in 4.2. The approval of the preproduction sample authorizes the commencement of production but does not relieve the supplier of the responsibility for compliance with all provisions of this specification. The preproduction samples shall be manufactured in the same facilities to be used for the manufacture of the production items.

3.4 Materials.-

- * 3.4.1 Base cloth.- The base cloth shall be 1.6 oz./sq. yd., rip-stop nylon cloth, color Olive Green No. 106, conforming to type III of MIL-C-7020.

3.4.2 Coating compound.- The coating compound shall be a composition of polyurethane suitably compounded and pigmented to meet the requirements herein. If the polyurethane is plasticized, only phthalate or phosphate ester plasticizers shall be used (see 6.4).

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ILLUSTRATION 14. A MILITARY SPECIFICATION EXCERPT, SHOWING THE MATERIALS REQUIRED FOR THE POLYURETHANE COATED NYLON CLOTH (PARAGRAPH 3.4: HIGHLIGHTED). (ALSO NOTE PARAGRAPH 3.4.1 FURTHER MENTIONS A 1.6 OUNCE, TYPE III CLOTH, OF 'MIL-C-7020' (HIGHLIGHTED).) (SOURCE: MILITARY SPECIFICATION 'MIL-P-43473A', DATED 19 SEPT. 1968.)

MIL-C-43473A

- * 3.4.2.1 Resistance to insect repellent (diethyltoluamide).- The coated fabric shall show no lifting of the coating, no tackiness, no solvation, pickoff of the coating, adherence of the coating to itself greater than scale rating No. 3 (slight blocking) when tested as specified in 4.3.3.

3.4.3 Dusting powder.- When used, (see 3.5), the dusting powder shall be whiting, talc or other finely divided mineral material which does not support mildew growth.

- * 3.5 Coated cloth.- The cloth shall be coated on one side only with the coating specified in 3.4.2 and shall conform to all the requirements of table I, when tested as specified in 4.3.3. A suitable water repellent finish shall be applied to the coated cloth to insure conformance to the abrasion and water wicking requirements of the finished coated fabric (see 6.5). At the option of the supplier, the coated side may be dusted with the dusting powder specified in 3.4.3.

TABLE I.- Physical requirements

| Characteristic | Requirement | |
|--|--------------------------|---------|
| | Minimum | Maximum |
| Weight, oz./sq. yd. | 2.50 | 3.25 |
| Breaking strength, pounds | | |
| Warp | 50 | |
| Filling | 50 | |
| Tearing strength, grams | | |
| Warp | 700 | |
| Filling | 900 | |
| Hydrostatic resistance, p.s.i. | | |
| Initial | 80 | |
| After accelerated weathering | 25 | 1/ |
| After abrasion | 50 | |
| After strength of coating | 50 | |
| After high humidity | 25 | 1/ |
| Colorfastness after high humidity | No appreciable change 2/ | |
| Stiffness, cms | | |
| At standard conditions | -- | 7.0 |
| At 0°F. | -- | 10.0 |
| Adhesion of coating, lbs./2-inch width | 7.0 | |
| Blocking, scale rating | -- | No. 2 |
| Water wicking, inches | -- | 1/8 |
| Resistance to Leakage | No Leakage 3/ | |

1/ The coating shall not become stiff and brittle nor soft and tacky and there shall be no evidence of cracking or crazing under visual examination.

2/ Appreciable change in color means a change which is immediately noticeable in comparing the test specimen with the original comparison specimen. If closer inspection or a change of angle of light is required to make a slight change in color, the change is not considered appreciable.

3

ILLUSTRATION 15. A MILITARY SPECIFICATION EXCERPT, SHOWING THE SPECIFICS OF THE COATING PROCESS FOR THE POLYURETHANE COATED NYLON CLOTH (PARAGRAPH 3.5: HIGHLIGHTED) AND THE PHYSICAL REQUIREMENTS OF THE CLOTH (TABLE I: HIGHLIGHTED).

(SOURCE: MILITARY SPECIFICATION 'MIL-P-43473A', DATED 19 SEPT. 1968.)

MIL-C-7020E
8 October 1965
Superseding
MIL-C-7020D
19 September 60

MILITARY SPECIFICATION

CLOTH, PARACHUTE, NYLON

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers three types of nylon cloth for use in fabrication of parachutes.

1.2 Classification. The nylon cloth shall be of the following types and weaves, as specified (see 6.2):

Type I - (Weight 1.1 oz./sq. yd.) - Rip-stop weave
Type II - (Weight 1.6 oz./sq. yd.) - Twill weave
Type III - (Weight 1.6 oz./sq. yd.) - Rip-stop weave

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

CCC-T-191
PPP-P-51

Textile Test Methods
Packaging, Packing, and Marking
of Textile Fabrics (Woolens,
Worstedes, Cottons, Silks, and
Synthetics)

STANDARDS

Military

MIL-STD-105

Sampling Procedures and Tables
for Inspection by Attributes

FSC 8305

ILLUSTRATION 16. A MILITARY SPECIFICATION EXCERPT DISPLAYING THE
BASIC SCOPE OF THE LMP NYLON PARACHUTE CLOTH. (NOTE THAT
PARAGRAPH 1.2 SHOWS THE 1.6 OUNCE CLOTH CLASSIFICATION (TYPE III)
(HIGHLIGHTED).)
(SOURCE: MILITARY SPECIFICATION 'MIL-C-7020E', DATED 8 OCT. 1965.)

MIL-C-7020E

MIL-STD-109
MIL-STD-414

MIL-STD-851

Inspection Terms and Definitions
Sampling Procedures and Tables
for Inspection by Variables for
Percent Defective
Coding: Manufacturer's Color,
Nylon Parachute Cloth

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

Rules and Regulations Under The Textile Fiber Products Identification Act

(Application for copies should be addressed to the Federal Trade Commission, Washington 25, D. C.)

3. REQUIREMENTS

3.1 Standard sample. The cloth shall match the standard sample for shade and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced. (see 6.3)

3.2 Material. The nylon used in the manufacture of all types of parachute cloth shall be a bright, high tenacity, light and heat resistant polyamide prepared from hexamethylene and adipic acid or its derivatives. It shall have a melting point of $250^{\circ} \pm 6^{\circ}\text{C}$. ($482^{\circ} \pm 10^{\circ}\text{F}$.) when tested in accordance with 4.4.5. The yarn shall not be bleached in any manner or process.

3.2.1 Fiber identification. Each roll of cloth shall be labeled or ticketed and invoiced for fiber content in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

3.3 Weave

3.3.1 Type I weave. The weave pattern for type I cloth shall be as specified in figure 1. Reinforcement ribs in both warp and the filling shall form a uniform pattern of squares. There shall be a minimum of 6.5 repeats of the pattern per inch in both directions.

3.3.2 Type II weave. The weave pattern for type II cloth shall be a two-up and one-down twill.

3.3.3 Type III weave. The weave pattern for type III cloth shall be as specified in figure 2. Reinforcement ribs in both the warp and the filling

ILLUSTRATION 17. A MILITARY SPECIFICATION EXCERPT DISPLAYING THE OVERALL REQUIREMENTS OF THE LMP NYLON PARACHUTE CLOTH. (NOTE THAT PARAGRAPH 3.3.3 DISCUSSES THE TYPE III WEAVE, AND MENTIONS FIGURE 2. (HIGHLIGHTED).)
(SOURCE: MILITARY SPECIFICATION 'MIL-C-7020E', DATED 8 OCT. 1965.)

MIL-C-7020E

directions shall form approximate squares. There shall be approximately 6 repeats of the pattern per inch in the filling direction and 5.5 repeats per inch in the warp direction.

3.4 Physical and chemical properties. The physical and chemical properties of the finished cloth shall conform to table I and subparagraphs thereto.

TABLE I PHYSICAL PROPERTIES

| Property | Type I | Type II | Type III |
|---|-------------------|--------------|--------------|
| Weight, ounces per square yard (maximum) | 1.1 | 1.6 | 1.6 |
| Thickness, inches (maximum) | 0.003 | 0.004 | 0.004 |
| Breaking strength, ravel strip, pounds per inch (maximum) | | | |
| Warp | 42 | 50 | 50 |
| Filling | 42 | 50 | 50 |
| Elongation, both directions, percent (minimum) | 20 | 20 | 20 |
| Tearing strength, tongue, pounds (minimum) | | | |
| Warp | 5 | 5 | 4 |
| Filling | 5 | 5 | 4 |
| Air permeability, CFM of air per square foot of cloth | $100 \pm 20^{1/}$ | 130 ± 30 | 130 ± 30 |
| Yarns per inch (minimum) | | | |
| Warp | 120 | 120 | 120 |
| Filling | 120 | 76 | 76 |
| Twist, turns/inch (minimum) | | | |
| Warp | 5 | 5 | 5 |
| Filling | - | - | - |

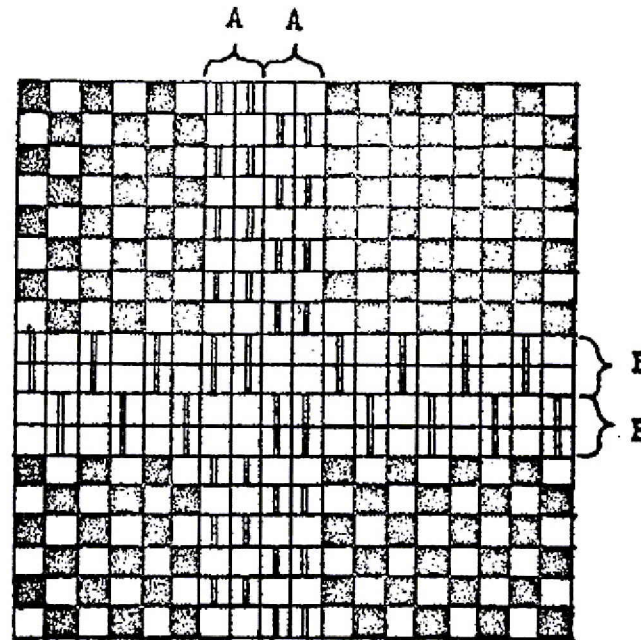
1/ For type I cloth, see 6.4

3.4.1 Finishing. The type I cloth shall be given a preliminary scour sufficient to remove sizing and other contamination, at a temperature which will not cause fixation of same into the cloth or result in permanent setting of the fabric. The cloth shall be dried and calendered at sufficient temperature and pressure so as to control the air permeability in the finished cloth. The finisher may, at his discretion, omit the pre-scour and subject clean greige goods directly to the calendering operation. Further wet processing of the fabric shall be accomplished at a temperature in excess of 200° F in order to stabilize air permeability. The length of time required for complete setting of the cloth at this temperature shall be sufficient to shrink and set the cloth and meet the requirements as set forth in 3.4.1.1. The above finishing procedure outlined for type I fabric is optional for finishing type II and type III fabrics which also must meet the requirements as set forth in 3.4.1.1. None of the fabrics shall be bleached in any manner or process.

3.4.1.1 Permanence of finish. The permanence of the cloth finish shall be such that when the cloth is subjected to the test specified in 4.4.2:

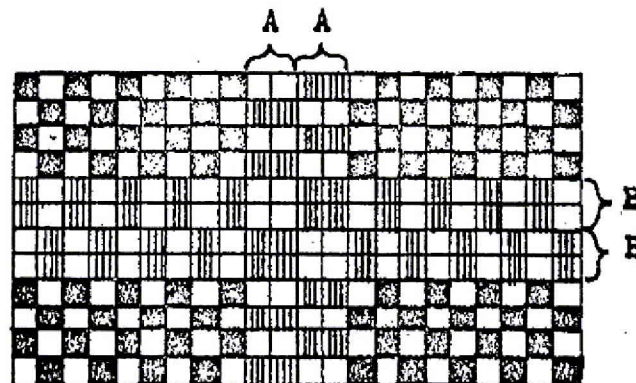
ILLUSTRATION 18. A MILITARY SPECIFICATION EXCERPT, DISPLAYING THE OVERALL PHYSICAL REQUIREMENTS OF THE LMP NYLON PARACHUTE CLOTH (TABLE I) (HIGHLIGHTED).
(SOURCE: MILITARY SPECIFICATION 'MIL-C-7020E', DATED 8 OCT. 1965.)

MIL-C-7020E



A = TWO WARP ENDS WOVEN AS ONE
B = TWO FILLING PICKS PER SHED

FIGURE 1. Rip-stop weave pattern for type I cloth.



A = TWO WARP ENDS WOVEN AS ONE
B = TWO FILLING PICKS PER SHED

REPEAT EACH WAY

FIGURE 2. Rip-stop weave pattern for type III cloth.

ILLUSTRATION 19. A DRAWING OF THE TYPE III WEAVE PATTERN (FIG. 2).
(SOURCE: MILITARY SPECIFICATION 'MIL-C-7020E', DATED 8 OCT. 1965.)

Lastly, the artifact sample was compared to the material of an Australian Military Raincoat (AMR). While not a U.S. Military issue wet weather item, this unique garment was sometimes used in South East Asia (SEA) by American soldiers of the elite U.S. Army Special Forces, of which the individual associated with this case was assigned to. Sometimes worn as an alternative wet weather item in lieu of standard issue items, the distinctly camouflaged AMR was at times obtained by U.S. Army Special Forces personnel through trading or other dealings with Australian Military personnel also stationed in SEA (seen in Pictures 21 And 22).



PICTURE 21. THE AUSTRALIAN MILITARY RAINCOAT (FRONT VIEW).

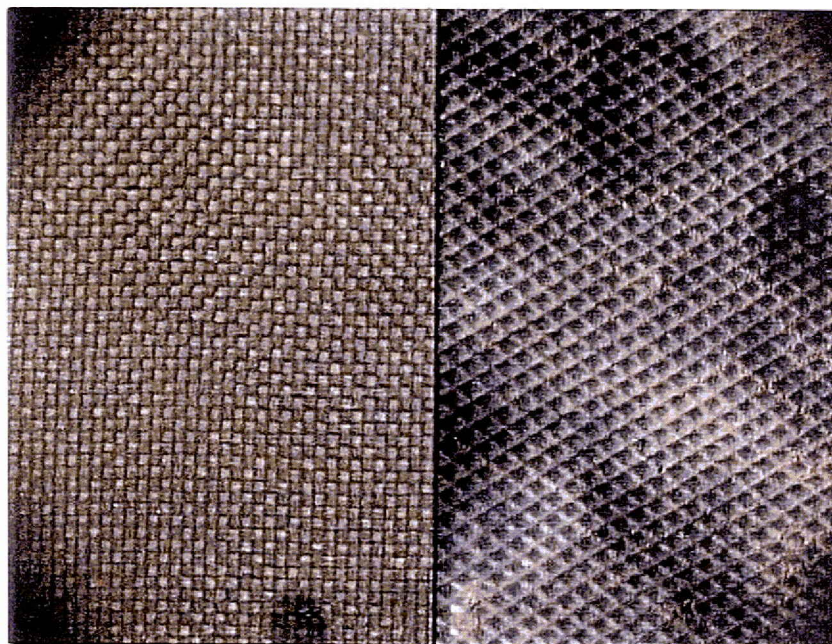
Unlike the simple pullover design of the U.S. Military wet weather ponchos, the AMR was a conventional garment. It's overall design displayed many unique features, such as: knee-length coverage, a hem drawcord, a six button frontal closure, a wide fold-down collar (that could be folded up for additional protection and secured with two respective buttons), buttoned sleeve cuffs, a left breast buttoned pocket and two front hip covered slash pockets. The AMR also featured an interior mesh liner in the upper torso area, which allowed the garment to breathe via a covered vent at each breast exterior, and one large vent across the upper back exterior (seen in Pictures 21 & 22). Overall, the most unique feature of the AMR was that it could be completely folded and stored within its left breast pocket.



PICTURE 22. THE AUSTRALIAN MILITARY RAINCOAT (REAR VIEW).

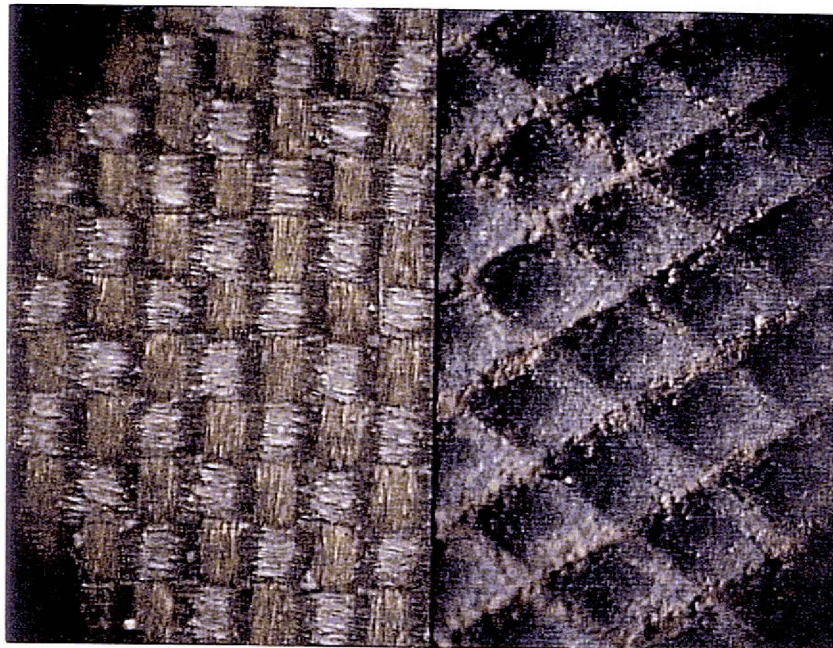
As with the EMP and LMP, the AMR was a cloth-based garment, and appeared to be manufactured with a nylon cloth. (As the AMR is a foreign made garment, no Military Specifications could be rapidly obtained to provide technical information about it.) An interesting AMR cloth feature that differed from the U.S. ponchos was that it was printed with a camouflage pattern. This distinct pattern was a single-color 'splotch' type, applied onto a lighter single-color background.

Upon detailed macroscopic examination, the AMR exhibited a distinctive cloth weave that again, did not correlate to the artifact sample. Like the U.S. ponchos, the AMR garment's cloth weave contrasted to the molded plastic of the artifact (Pictures 23 & 24).



PICTURE 23. A SPLIT-LENS PHOTO OF THE AMR SAMPLE (LEFT SIDE)
ALONGSIDE AN ARTIFACT SAMPLE, AS SEEN THROUGH A LEICA DMC
COMPARISON MACROSCOPE (AT A 2.5 x MAGNIFICATION RATE).
(Note: The AMR's woven cloth pattern, as opposed to the artifact's molded pattern.)

As found in macroscopic comparison studies to the EMP and LMP, the artifact was noted to display no similarities to the AMR, once again supporting that the artifacts did not originate from a garment manufactured with a cloth base (as found with the three reference wet weather garment types).



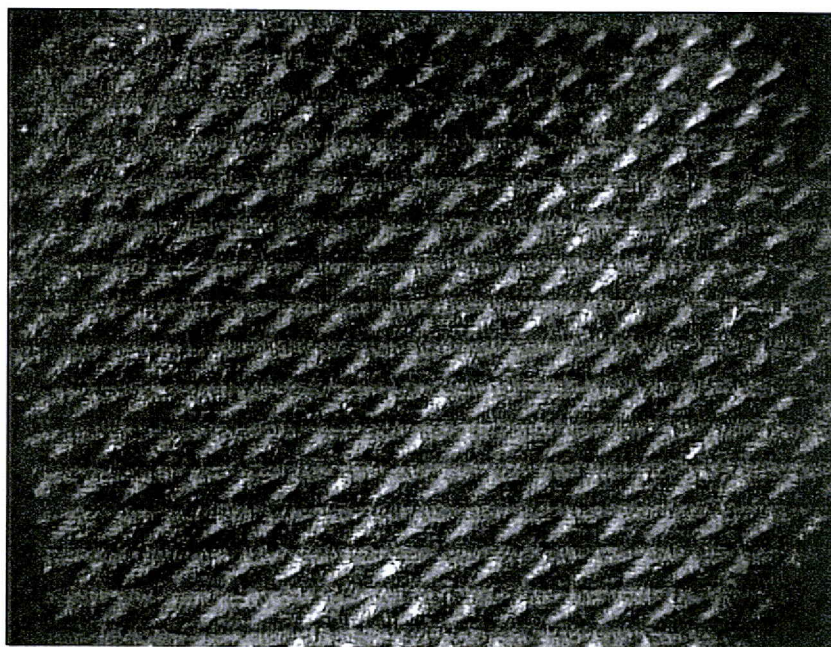
PICTURE 24. A SPLIT-LENS PHOTO OF THE AMR SAMPLE (LEFT SIDE)
ALONGSIDE AN ARTIFACT SAMPLE, AS SEEN THROUGH A LEICA DMC
COMPARISON MACROSCOPE (AT A 6.4 x MAGNIFICATION RATE).

(Note: The AMR's tight weave pattern bears no semblance to the artifact's molded surface.)

While four of the five artifacts matched each another in identical material thickness and texture patterns, the fifth artifact differed from the other four in two areas: it was fabricated from a thicker weight material, and it displayed the crosshatch pattern only on one side (exterior side: see Pictures 25 and 26), while the other side featured a smooth, non-textured surface (seen in Pictures 27 and 28).



PICTURE 25. THE FIFTH ARTIFACT (FRONT SIDE), FAINTLY SHOWING THE CROSSHATCH PATTERN.

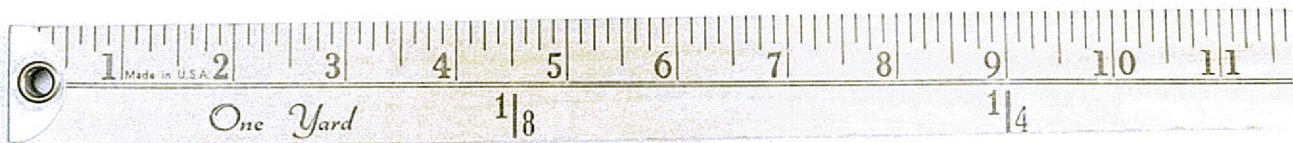


PICTURE 26. A CLOSE-UP VIEW OF THE FIFTH ARTIFACT'S CROSSHATCH
PATTERN ON IT'S FRONT SIDE, AS SEEN THROUGH A LEICA DMC
COMPARISON MACROSCOPE (AT A 5x MAGNIFICATION RATE).

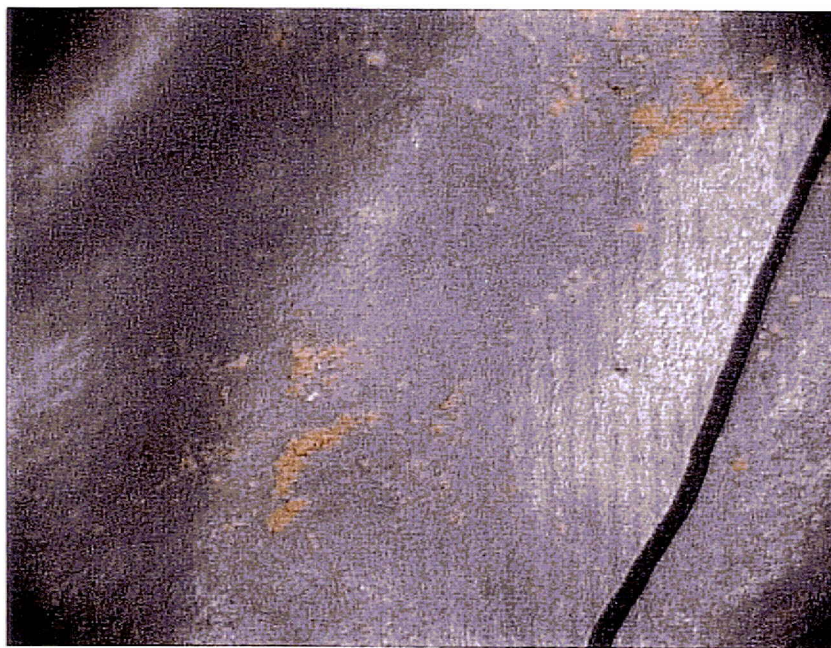
Also noted on the fifth artifact was that it displayed a finished bottom edge (with the hem folded under the bottom and secured), along with a closed loop (made of the same material) that was attached to the bottom edge (seen in Picture 27 below). In spite of these particular features however, this artifact, like the others, could not be associated with a U.S. Military wet weather garment.



JTF-FA CASE: 0608



PICTURE 27. THE FIFTH ARTIFACT (BACK SIDE), SHOWING THE SMOOTH SURFACE, THE FINISHED BOTTOM EDGE, AND THE CLOSED LOOP.



PICTURE 28. A CLOSE-UP VIEW OF THE FIFTH ARTIFACT'S SMOOTH, NON-TEXTURED SURFACE ON IT'S BACK SIDE, AS SEEN THROUGH A LEICA DMC COMPARISON MACROSCOPE (AT A 2.5x MAGNIFICATION RATE).

SUMMATION

In overall evaluation of the five recovered plastic sheet material artifacts, no similarities whatsoever could be observed between any of the artifacts to the standard three reference Military issue wet weather garments. Following extensive study and analysis, the artifact construction features were found to be consistent with a plastic molded material, as confirmed by a Material Identification test and a Comparative Materials Analysis (refer to Appendix B for both test analysis reports). These specific artifact manufacturing features definitively precluded the artifacts from bearing any association to a fabric-based wet weather garment (as exemplified by those garments that may have potentially been employed by the military unit involved with this particular case loss). In conclusion, the recovered artifacts are not consistent with wet weather gear of a U.S. or Allied Military origin, but rather are of an unknown and unfamiliar source.

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-R Date 18-Aug-2009
Initialed By: S. F. R.

CONCLUSIONS

Prior to examining the Conclusions contained within this report, it is considered important that any reviewer understand what they are based upon, and who was involved in their formulation. Over the past fifty years, very significant advancements have been made in aviation, with much of this technology focusing around demands for higher airspeed and greater maneuverability. However, with such advancements and an accompanying increase in transposed energy levels, came the ability for the flight regime to exceed human physiological capabilities, especially in military aviation. In consequence, with the higher onset of G-force rates, force levels could be attained which would render a crewmember unconscious, or even prevent such personnel from physically accomplishing some aircraft escape action. Likewise, from electronic technology came levels of data input being presented to a crewmember that could involve problems in mental task saturation, from being unable to process it quickly enough. These forms of problem essentially centered around the man-machine interface, and when suspected of being involved in the loss of an aircraft, were frequently described as the **Human Factor**. (While various definitions exist, human factors or ergonomics may be defined as the technology concerned to optimize the relationships between people and their activities by the systematic application of the human sciences, integrated within the framework of system engineering.) Accordingly in such mishap situations, which were often accompanied by high levels of prevailing energy, (and sometimes further complicated by aircraft borne military ordnance), this could result in very significant levels of destruction for both the aircraft and personnel within. It therefore became increasingly difficult for investigators to identify often subtle causes for aircraft losses, and to also provide accurate information about the presence or whereabouts of any involved personnel.

For more than a fifteen years the HSW Life Sciences Equipment Laboratory, (which is a totally unique facility within the Department of Defense), has developed some of the internationally recognized procedures and forms of training for specialists involved in such complex mishap investigations. Consequently, the Conclusions reached within this report are based not only upon the scientific evaluation of submitted artifacts involved with Case REFNO 0608, but are also based upon a culmination of the experience gained from the results of conducting hundreds of aircraft

mishap investigations. Similarly, any determinations reached about crew/personnel survival, conform to the same standards as those applied in determining the survival status of any personnel involved in current day aircraft or ground losses, where again only minimal site evidence might be recovered.

The actual analysis of life sciences equipment artifacts from Case REFNO 0608 was primarily accomplished by personnel assigned to the Life Sciences Equipment Laboratory (LSEL), its adjunct Life Sciences Artifact Section (LSAS) and other scientific personnel from peripheral support laboratories (involving Metallurgical, Chemical, Fabric and Textiles, Non-Destructive Inspection, and other disciplines) at the Cooperheat/MQS KSEL Scientific Section, Kelly AFB, Texas.

To ensure that an objective analysis of all case artifacts is reached, upon receipt they are initially assigned to a primary LSAS staff analyst, who is then responsible for the continuous tracking of studies completed upon them, as well as the final coordination of all their study inputs. In consequence, each case is investigated by a group of specialists, rather than by any one individual. This group possesses expertise in numerous scientific disciplines and equipment fields, which in most instances can counter peculiar investigative problems. Within this context, it must be appreciated that some aircraft series used in Southeast Asia, were often flown by different services, such as the F-4 by the USN/USMC/USAF; the OV-10 by the USAF/USN; and the UH-1 by all of the major services, making many items like fixed or ejection seats basically compatible across the board; while smaller items, like a USAF survival radio, might be acquired for use in the field by US Army personnel, in preference to their more bulky US Army issued equipment! Thus, by having artifacts examined by a group of investigators with different background specializations, such anomalies can normally be resolved, or more serious inconsistencies, such as those involved with artifacts/equipment emanating from some site supporting the wrong systems, aircraft, or service, can also be identified. (Currently the LSEL/LSAS is staffed by personnel who accumulatively have well over 400 years of previous military service, aircraft mishap investigation, and systems experience, in the life sciences equipment types now being investigated as artifacts, that were previously used by all of the major American Military Services engaged in the Southeast Asia conflict period; and some hold Southeast Asia veteran status.)

Therefore, the final **Conclusions** provided below are based upon: the amalgamated findings of all evidence contained within this report; the results of all examinations and scientific studies conducted upon the artifacts; and is a consentaneous outcome, based upon the regular review of all artifact evidence being compiled in Case REFNO 0608 by its investigative team, the primary members of which have signed this report.


CONCLUSIONS

1. Based upon information provided to the Life Sciences Equipment Laboratory, REFNO Case 0608 pertains to the loss of a U.S. Army Special Forces soldier on 06 March 1967 in Laos.
2. Following receipt, and in-processing of Case artifacts by the Life Sciences Artifact Section on 02 February 1999, a very extensive series of equipment studies and research was undertaken on 05 March 1999, including contact of various agencies and the tracing of certain personnel.
3. Scientific evaluation of all artifacts supported that they had originated from an unknown source, and were not consistent with wet weather equipment types associated with U.S. or Allied military forces in South East Asia. Overall, no indications were found of any attempt to tamper with or alter the artifact evidence.
4. The artifact studies conducted to date, could not confirm the loss of the reported individual, nor could artifact studies positively identify or support a potential/possible burial site or location.

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009□
Initialed By: S. F. R.

REPORT RELEASED BY:

ON: 28 MAY 1999



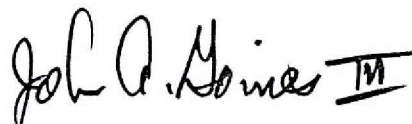
Alejandro P. Villalva
U.S. Army Equipment Analyst
Life Sciences Artifact Section
(Primary LSAS Case
Assigned Analyst)



Gary Littleton
Staff Scientific Photographer
Life Sciences Equipment Laboratory



Don C. Sutherland
Staff Scientific Photographer
Life Sciences Equipment Laboratory



John A. Goines, III
Senior Equipment Analyst
Life Sciences Artifact Section



Charles S. Goodman, Jr.
Manager, Historical Operations
Life Sciences Artifact Section



Michael R. Grost
Chief, Life Sciences Equipment Laboratory
United States Air Force

FROM: HSW/YACE
Life Sciences Equipment Laboratory
514 Shop Lane (Bldg. 323)
Kelly AFB TX 78241-6434

SUBJECT: MEMORANDUM OF EQUIPMENT RECEIPT

A total of five artifact fragments identified as REFNO 0608 were received from JTF-FA on 02 Feb 1999, and placed under physical laboratory control on the same day.



Alejandro P. Villalva
Equipment Analyst
Life Sciences Artifact Section

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009 ☐
Initialed By: S. F. R.

GLOSSARY LIST OF KEY WORDS AND TERMS

1) LIFE SCIENCES EQUIPMENT:

That equipment/apparel category which encompasses most systems associated with: all types of aircrew flight ensembles, military uniforms, combat infantry equipment, aircraft fixed or ejection seats, along with other devices used for escape, survival and evasion; most special application and personnel parachute equipment, ejection seat drogue parachutes, and aircraft braking chutes; all forms of land surface terrain and water environment survival aids, including man/aircraft mounted survival kits, life rafts and personnel life preservers; avionic locators and communication devices; and numerous other items ranging from combat body armor to personnel identification tags or blood chits.

2) ARTIFACT:

A man-made article of equipment/apparel typically excavated or recovered from the site or general location of some loss, which is forwarded for scientific analysis and evaluation, with emphasis to determine material origin and the possible presence of associated personnel at the site.

3) MASTER REFERENCE EQUIPMENT/SAMPLE:

A positively identified article of equipment/apparel which is employed to scientifically match to the equipment type represented by the artifact in it's construction properties, structural features, and overall design. This type of comparison item is the closest representation of the artifact, and utilized whenever possible. This type of comparative study is also designed to attain the most accurate level of identification/correlation.

4) REPRESENTATIVE EQUIPMENT/SAMPLE:

An identified article of equipment/apparel which, while similar overall in design to the equipment type represented by the artifact, will not match as closely as a Master Reference item due to series, manufacturer, modification, or other known differences. This type of comparison item has to be used when no Master Reference item is available, or the artifact itself is limited by size, condition, or similar factors, thereby preventing a precise matching potential.

5) OPTICAL MICROSCOPY:

Investigation utilizing a microscope which visually magnifies small objects, especially objects too small to be clearly seen by the unaided eye.

6) COMPARATIVE MATERIALS ANALYSIS:

The scientific process (es) of comparing samples from certain artifacts to control samples from known Master Reference items, to physically validate the artifact to a particular equipment type.

7) SCANNING ELECTRON MICROSCOPE (SEM) :

An instrument capable of very high magnification levels, utilizing electrons that are bombarded onto the sample to create an image.

8) CIRCA:

About, or in approximation to, a particular time period.

9) DOCUBOX:

An examination system based on visual inspection of material items under various surface light exposure sources, within and beyond the visual spectrum. These exposure sources include side angled surface light, Infrared Surface Light (IR (REMI)), Infrared Surface Light-Blue (IR luminescence (FLUO)), and Ultraviolet Illumination Light (UV range).

10) LEICA DMC COMPARISON MACROSCOPE:

A specialized instrument utilizing two imaging light paths for structural comparisons, allowing split or superimposed imaging and documentation (photo or video).

GLOSSARY LIST OF KEY WORDS SPECIFIC TO REFNO 0608

1) CROSSHATCH:

To mark/design with two or more intersecting parallel lines.

2) PONCHO:

A blanketlike cloak having a hole in the center for the head, that can be used as a body cover under inclement weather conditions, or for other applications by its user.

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DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

EXECUTIVE SUMMARY

Subject: Life Sciences Equipment Findings of Artifacts from JTF-FA
REFNO 0608.

Summary:

1. Based upon information provided to the Life Sciences Equipment Laboratory, REFNO Case 0608 pertains to the loss of a U.S. Army Special Forces soldier on 06 March 1967 in Laos.
2. Following receipt, and in-processing of Case artifacts by the Life Sciences Artifact Section on 02 February 1999, a very extensive series of equipment studies and research was undertaken on 05 March 1999, including contact of various agencies and the tracing of certain personnel.
3. Scientific evaluation of all artifacts supported that they had originated from an unknown source, and were not consistent with wet weather equipment types associated with U.S. or Allied military forces in South East Asia. Overall, no indications were found of any attempt to tamper with or alter the artifact evidence.
4. The artifact studies conducted to date, could not confirm the loss of the reported individual, nor could artifact studies positively identify or support a potential/possible burial site or location.

**

**

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IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

APPENDIX A

ARTIFACT CONDITION UPON RECEIPT AND PRIOR TO LABORATORY ANALYSIS

The following Inventory, Preliminary Identification, and Photography was accomplished upon receipt and before laboratory analysis of the artifacts, so as to record their original condition. As a result, initial classification of the artifacts may differ from those reached in the final case study results. The tray letters were assigned by the Life Sciences Artifact Section and correspond to the bags in which the artifacts were received.

JTF-FA CASE: 0608

Artifact Inventory and Preliminary Identification

| Bag A-Artifact I | |
|-------------------------|--------------------------|
| Artifact Item | Fragment Quantity |
| 1) Sheet Material | 1 |

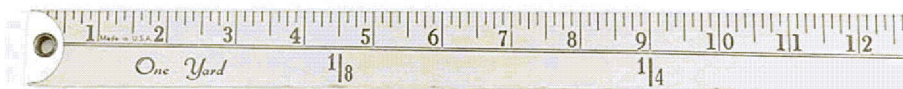


JTF-FA **CASE: 0608**

PICTURE 1. BAG A - ARTIFACT I.

(Note: Each of the five artifacts in Bag A was photographed separately, to better show overall detail and size.)

| Bag A-Artifact II | |
|-------------------|-------------------|
| Artifact Item | Fragment Quantity |
| 1) Sheet Material | 1 |



JTF-FA
CASE: 0608

PICTURE 2. BAG A - ARTIFACT II.

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| Bag A-Artifact III | |
|--------------------|-------------------|
| Artifact Item | Fragment Quantity |
| 1) Sheet Material | 1 |



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CASE: 0608

PICTURE 3. BAG A - ARTIFACT III.

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Initialed By: S. F. R.

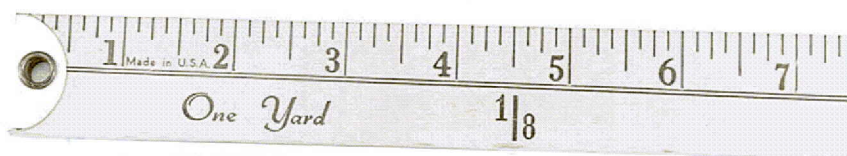
| Bag A-Artifact IV | |
|-------------------|-------------------|
| Artifact Item | Fragment Quantity |
| 1) Sheet Material | 1 |



PICTURE 4. BAG A - ARTIFACT IV.

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DOD 5400.7-RDate18-Aug-2009
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| Bag A-Artifact V | |
|-------------------|-------------------|
| Artifact Item | Fragment Quantity |
| 1) Sheet Material | 1 |



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CASE: 0608

PICTURE 5. BAG A - ARTIFACT V.

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Initialed By: S. F. R.

JOINT TASK FORCE
FULL ACCOUNTING
REFNO. 0608

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IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

Laboratory Analysis Report
Charles P. Serafini
Cooperheat/MQS KSEL
Kelly AFB
Metallurgical Science Section

LABORATORY ANALYSIS REPORT

1. DATE

25 May 1999

2. TO
Life Sciences Equipment Laboratory
Michael Grost/210-925-0161
DSN 945-0161

3. FROM
Cooperheat/MQS KSEL
Metallurgical Science Section

4. FOR ADDITIONAL INFORMATION, CONTACT
(Name and AUTOVON/Phone No)
Charles Serafini
210-922-6042

5. ITEM/SAMPLE IDENTITY
Life Sciences Equipment

6. DATE RECEIVED
29 Apr 1999

7. ITEM/SAMPLE SOURCE OR END ITEM APPLICATION
JTF-FA-0608

8. LAB CONTROL NO
M99145-139

9. TYPE OF ANALYSIS REQUESTED
Comparative Materials Analysis

FUND CITE:
5793400 309 4740 351263 04 592 660700 78070 F28500

10. MQS CONTROL NUMBER:
MQS 99104-05

1. This analysis and report are in conjunction with the overall investigation of Joint Task Force Full Accounting REFNO 0608 (JTF-FA-0608). The following items were submitted to the Cooperheat/MQS KSEL Metallurgical Science Section for comparative materials analyses:

- a. Artifact
- b. U.S. Military Early Model Poncho (control sample)
- c. U.S. Military Late Model Poncho (control sample)
- d. Australian Military Raincoat (control sample)

2. Each of the item's control sample and artifact pieces were photographed as received. Each of the item's control sample and artifact pieces were photographed with a Polaroid MP-4 camera (1:4.5 f-35mm lens) at an 8.4X magnification. The control sample and artifact items were also photographed with a Leica DMC Comparison Macroscope at a 17X magnification. The macroscopic photographs were made so that a comparison of the fabric weave patterns could be accomplished by analyzing for similarities and differences between the control sample and the artifacts. In addition, each of the fabric samples were examined under a Zeiss SV11 macroscope for fabric weave pattern comparisons.

Note: When comparing the sample items to artifacts for fabric weave pattern similarities, some consideration must be permitted in the artifact for the types of destructive elements to which they were exposed (as exemplified by tearing or compression loading in an air crash or explosion) and extended duration environmental exposure (for example, material fading or rotting actions).

3. The results of the comparative materials analyses are as follows:

- a. Poncho

| item | result | photos |
|--|----------------|------------|
| U.S. Military Early Model Poncho v. Artifact | does not match | 1-3, 10-12 |
| U.S. Military Late Model Poncho v. Artifact | does not match | 4-6, 10-12 |
| Australian Military Raincoat v. Artifact | does not match | 7-9, 10-12 |

Charles Serafini
Materials Engineer

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.



Photo 1: U.S. Military Early Model Poncho

Control sample item as received.

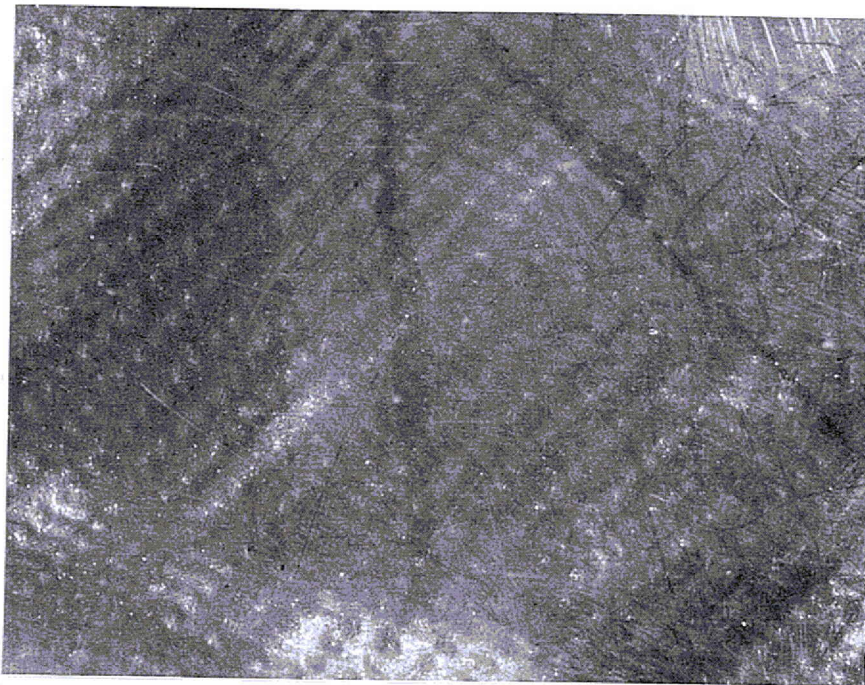


Photo 2: U.S. Military Early Model Poncho

Control sample item enlargement (8.4X) showing the fabric weave pattern (obscured by the coated surface).

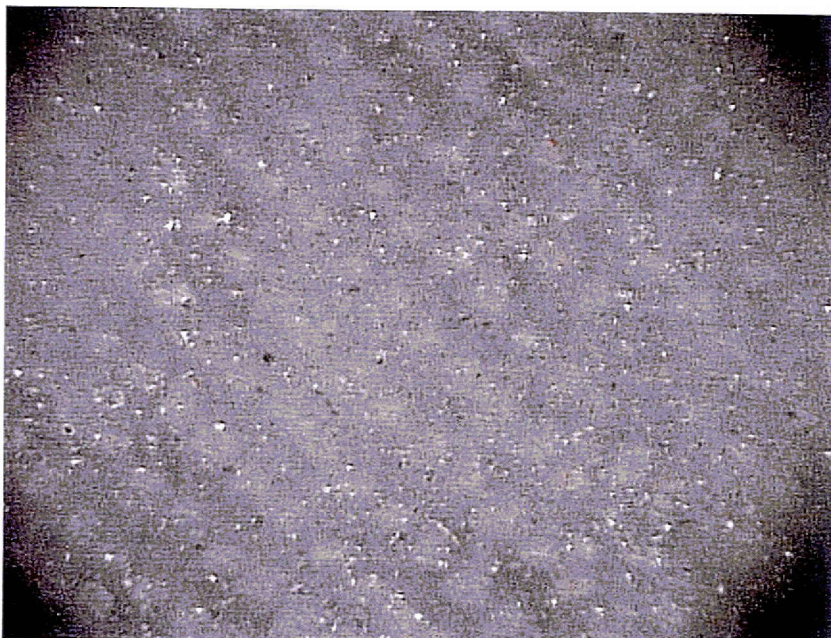


Photo 3: U.S. Military Early Model Poncho

Control sample item enlargement (17X) showing the fabric weave pattern (obscured by the coated surface).

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DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.



Photo 4: U.S. Military Late Model Poncho

Control sample item as received.

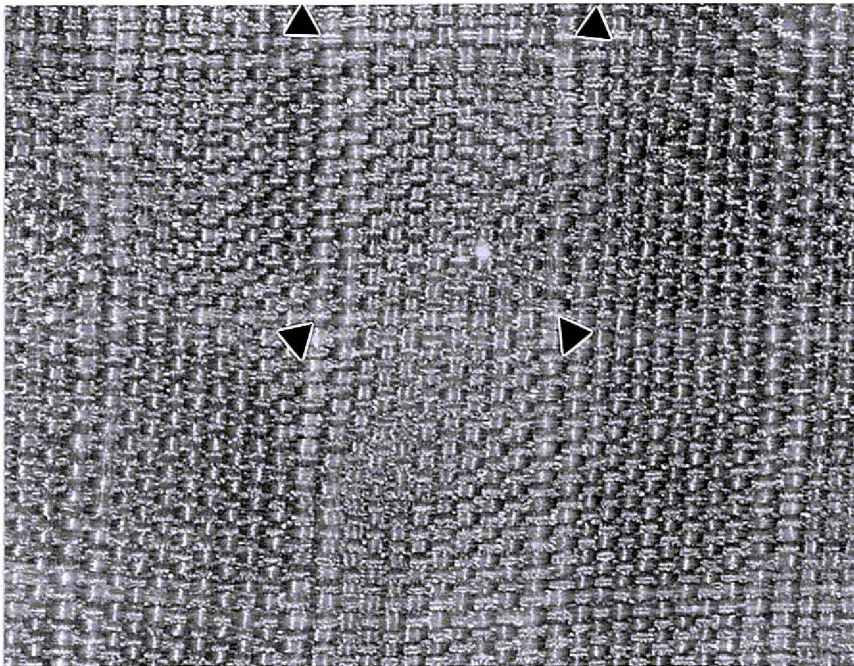


Photo 5: U.S. Military Late Model Poncho

Control sample item enlargement (8.4X) showing the fabric weave pattern.

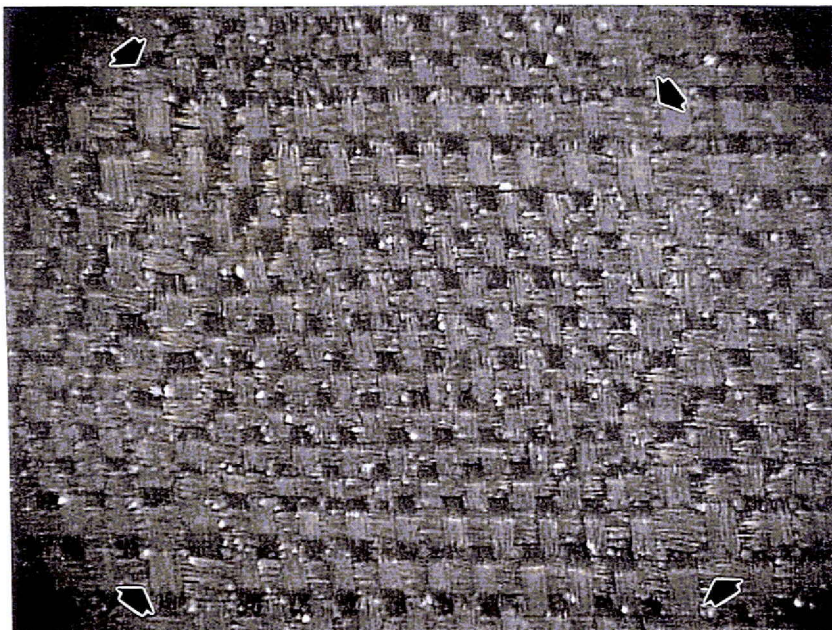


Photo 6: U.S. Military Late Model Poncho

Control sample item enlargement (17X) showing the fabric weave pattern.

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.



Photo 7: Australian Military Raincoat

Control sample item as received.

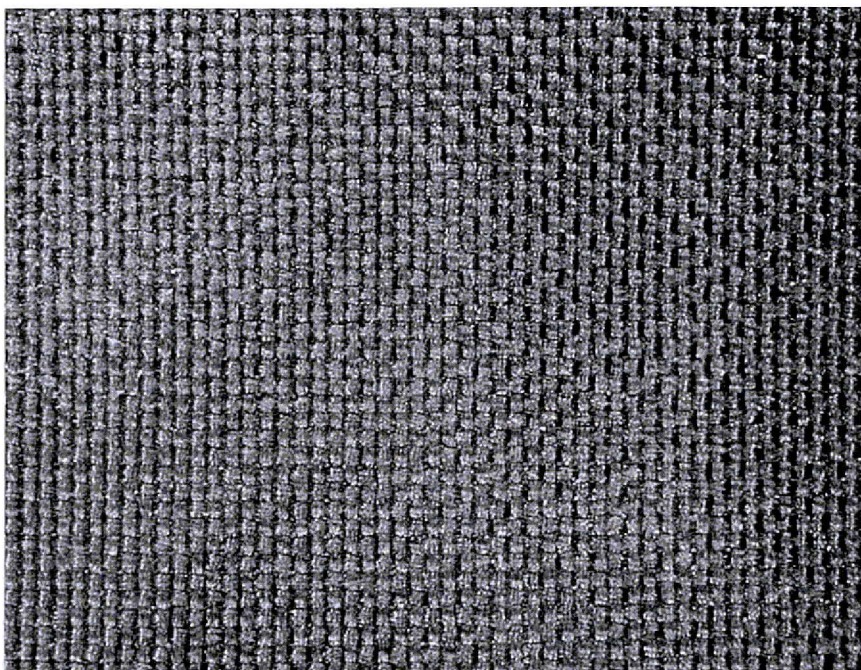


Photo 8: Australian Military Raincoat

Control sample item enlargement (8.4X) showing the fabric weave pattern.

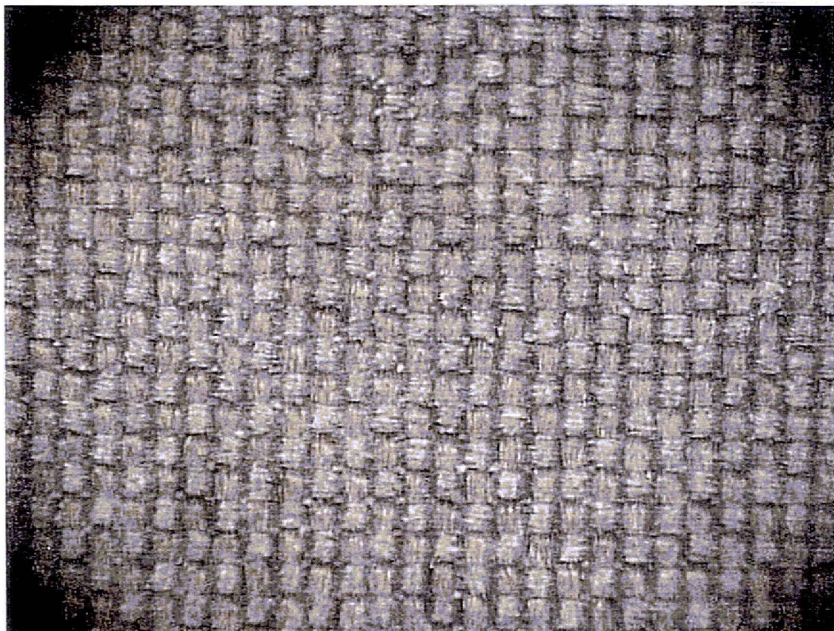


Photo 9: Australian Military Raincoat

Control sample item enlargement (17X) showing the fabric weave pattern.

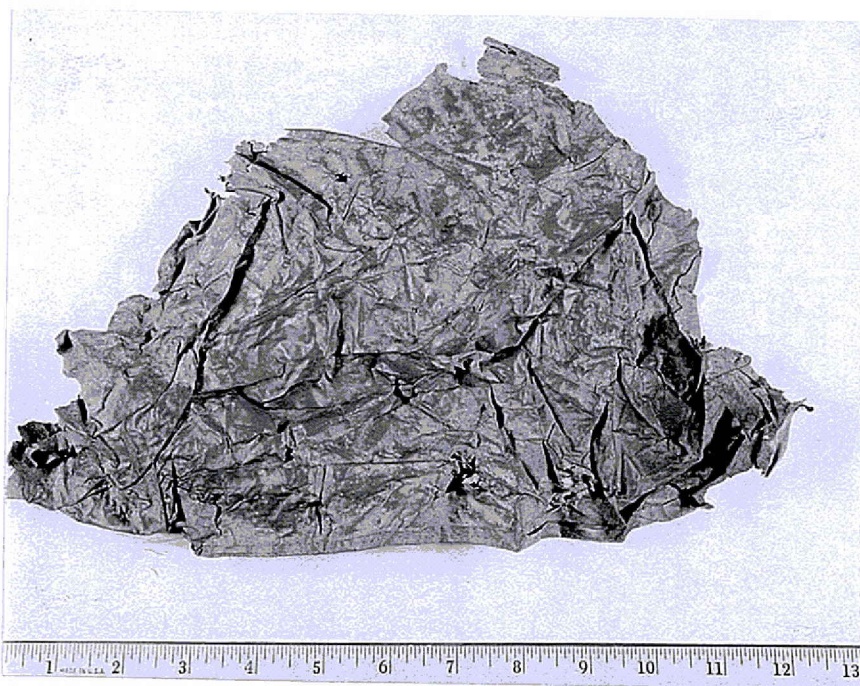


Photo 10: Artifact

Artifact item as received.

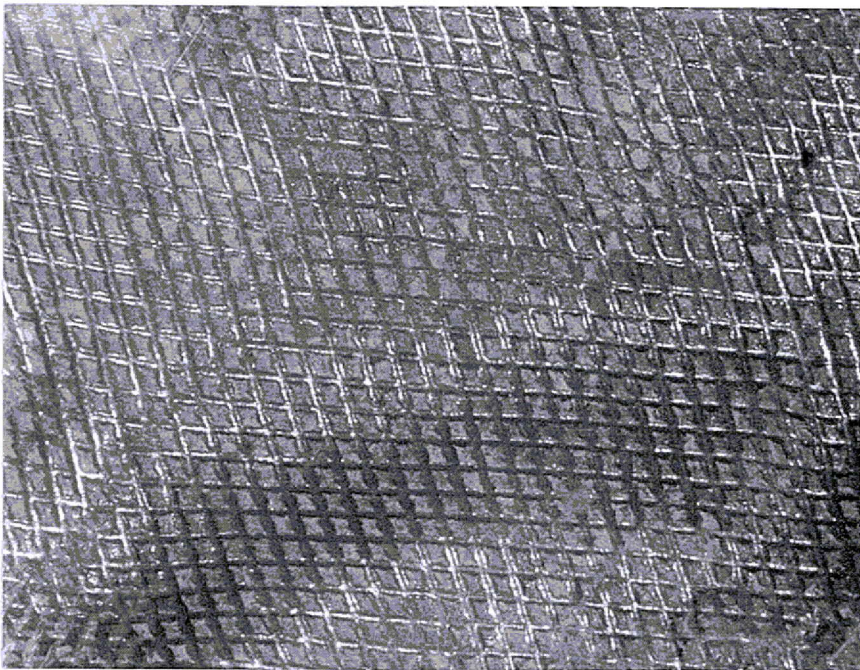


Photo 11: Artifact

Artifact item enlargement (8.4X)
showing the fabric weave pattern.

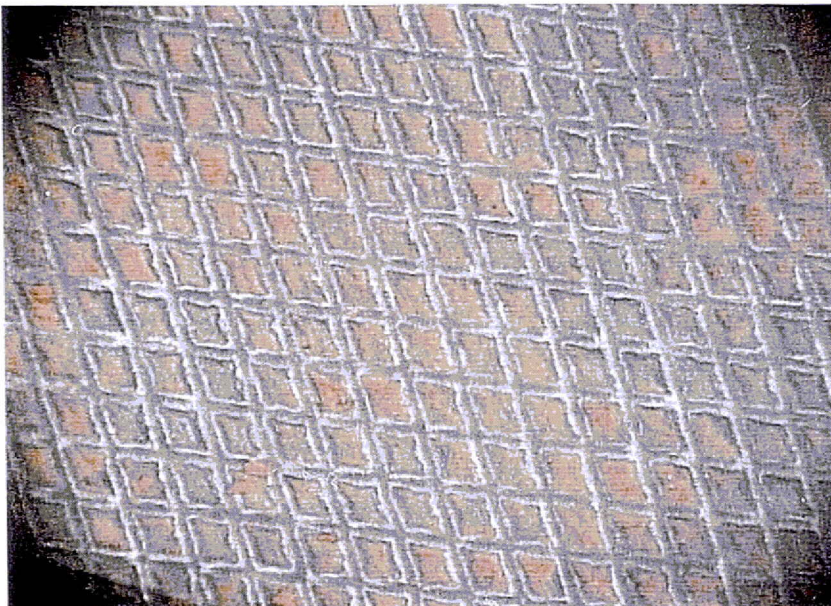


Photo 12: Artifact

Artifact item enlargement (17X)
showing the surface pattern.

LABORATORY ANALYSIS REPORT

1. DATE

27 May 99

2. TO

311 HSW/YACE
Alex Villalva

3. FROM

311 HSW/YACE (Textile Laboratory)
Kelly AFB, TX 78241

4. FOR ADDITIONAL INFORMATION, CONTACT
(Name and AUTOVON/Phone No)

Tony M. Hernandez/DSN 945-3355

5. ITEM/SAMPLE IDENTITY

Green Material

6. DATE RECEIVED

7. ITEM/SAMPLE SOURCE OR END ITEM APPLICATION

8. LAB CONTROL NO

993029-TL

9. TYPE OF ANALYSIS REQUESTED

Material Identification

10. STORAGE LOCATION NO

1. The Textile Laboratory received a piece of green plastic/fabric for material identification. The material was identified as Life Sciences Artifacts Project No.: REFNO 0608.
2. The green material was analyzed by Infrared Spectroscopy and Thermal Analysis. The material was identified as vinyl chloride plastic. The plastic sheeting contained a nylon carrier fabric.
3. The nylon carrier fabric is not consistent with the nylon fabric used in U.S. Military ponchos as per Military Specifications, MIL-P-3003, MIL-P-43700, MIL-C-577 and MIL-C-43473.
4. This plastic material is typical of material used in lightweight commercial raincoats and ponchos.

Tony M. Hernandez

Tony M. Hernandez
Chemist
Textile Laboratory

Reviewed by DPMO
IAW 50 USC 435 Note &
DOD 5400.7-RDate18-Aug-2009
Initialed By: S. F. R.

APPENDIX CCONSULTANTS CONTACTED DURING THE INVESTIGATION OF
JTF-FA CASE 0608 ARTIFACT ANALYSIS

During the course of this investigation involving Life Sciences Equipment Artifacts from Case 0608, various specialists were contacted from within the Department of Defense, the contractor manufacturing community, and private citizens, to obtain the widest possible base of scientific expertise and insight into the artifacts involved. The kind assistance provided by the individuals and organizations below is acknowledged, towards determining the findings and conclusions reached within this report.

| NAME | OCCUPATION | ORGANIZATION |
|-----------------------|--|--|
| Mr. R. Poehler | SEA Veteran, Former USA Special Forces Officer | Freedom, CA |
| Mr. Anthony Pizzo | Engineering Technician | Defense Personnel Support Center, Philadelphia, PA |
| Ms. Joanna McFalls | Textile Technologist | NCTRF USN Philadelphia, PA |
| Mr. Charles Serafini | Metallurgical Science Section | Cooperheat/MQS KSEL Facility-Kelly AFB |
| Mr. Tony M. Hernandez | Textile Laboratory | HSW/YACE, Brooks AFB, TX |